CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 8
TO
CLEANUP AND ABATEMENT ORDER NO. 85-81

PACO TERMINALS INC.
SAN DIEGO UNIFIED PORT DISTRICT

The California Regional water quality Control Board, San Diego Region, (hereinafter Regional Board) finds that:

1. On December 17, 1985, the Regional Board Executive Officer issued Cleanup and Abatement Order No. 85-91, Paco Terminals Inc., National City, San Diego County. Order No. 85-91 was issued to Paco Terminals Inc. (Paco Terminals) for violations of Order Nos. 79-72 and 84-50, NPDES Permit No. CA0107930. Order Nos. 79-72 and 84-50 contained waste discharge requirements regulating the storage and loading of copper ore at the San Diego Unified Port District's (Port District's) 24th Street Marine Terminal.

2. On November 13, 1987, the Regional Board Executive Officer issued Addendum No. 1 to Cleanup and Abatement Order No. 85-91 and, on November 21, 1988, the Regional Board Executive Officer issued Addendum No. 2 to Cleanup and Abatement Order No. 85-91.

3. On February 27, 1989, the Regional Board adopted Addendum No. 3 to Cleanup and Abatement Order No. 85-91. Addendum No. 3 named the Port District as a responsible party under Cleanup and Abatement Order No. 85-91.

4. On January 19, 1990 the Regional Board Executive Officer issued Addendum No. 4 to Cleanup and Abatement Order No. 85-91. Addendum No. 4 required Paco Terminals and the Port District to evaluate copper contamination at the 24th Street Marine Terminal site and complete cleanup of any contamination at the site by September 1, 1990.

5. On November 5, 1990, the Regional Board adopted Addendum No. 5 to Cleanup and Abatement Order No. 85-91. Addendum No. 5 established a revised time schedule for cleanup of copper contaminated sediment from San Diego Bay adjacent to the 24th Street Marine Terminal.

6. On January 28, 1991, the Regional Board adopted Addendum No. 6 to Cleanup and Abatement Order No. 85-91. Addendum No. 6 established a revised time schedule for cleanup of the copper contaminated sediment.

7. On December 9, 1991, the Regional Board adopted Addendum No. 7 to Cleanup and Abatement Order No. 85-91. Addendum No. 7 amended Cleanup and Abatement Order No. 85-91 by relaxing the cleanup level of copper contaminated sediment in San Diego Bay from 1,000 milligrams per kilogram (mg/kg) dry weight to 4,000 mg/kg (dry weight). Addendum No. 7 also established a revised time schedule for cleanup of the copper contaminated sediment.

8. On September 17, 1992 the State Water Resources Control Board (State Board) adopted Order No. WQ 92-09, (In the Matter of the Petition of Environmental Health Coalition and Eugene J. Sprofera, for Review of Cleanup and Abatement Order No. 85-91, Addendum No. 7 of the California Regional Water Quality Control Board, San Diego Region). The State Board revised Directive 2 of Addendum No. 7 to require cleanup to a sediment copper concentration less than 1,000 mg/kg (dry weight). The State Board did not stay Cleanup and Abatement Order 85-91 and addenda thereto during the petition review process.

9. The Port District has reported that the State Board decision to reinstate the 1,000 mg/kg copper cleanup level will require resubmission of permit applications due to the higher quantities of sediment which must be dredged. The Port District has also reported that there is no current plan for disposing of the larger quantities of sediment required to be dredged to comply with the 1,000 mg/kg copper cleanup level and that additional time is needed to develop such a plan. The Port District and Paco Terminals are currently pursuing an appeal of State Board Order No. WQ 92-09 in Superior Court. Based on these considerations, the Port District and Paco Terminals have requested additional time to comply with Directive Nos. 4.c. of Addendum No. 6 and Directive Nos. 2, 3.d, 3.e, 3.f and 3.g of Addendum No. 7.

10. Directive No. 4.c of Addendum No. 6 required the submission of all necessary applications for permits and other governmental approvals needed to implement the selected cleanup method by December 1, 1991. Directive No. 3.d of Addendum No. 7 required that dredging of copper contaminated sediment be initiated by October 1, 1992. To date, the Port District and Paco Terminals have not complied with these directives.

11. The issuance of this Addendum shall not be construed to relieve the Port District or Paco Terminals from potential administrative or judicial civil liabilities for violations of Directive 4(c) of Addendum No. 6 and Directive 3(d) of Addendum No. 7 of Cleanup and Abatement Order No. 85-91 occurring prior to the issuance of this Addendum.

12. This enforcement action is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000 et seq.) in accordance with Title 14, CCR, Chapter 3, Section 15321.

IT IS HEREBY ORDERED THAT, pursuant to California Water Code Section 13304, Paco Terminals and the Port District shall comply with the following:

1. Paco Terminals and the Port District shall reduce the sediment copper concentration in the affected portion of San Diego Bay to a sediment copper concentration less than 1,000 mg/kg (dry weight).

2. Paco Terminals and the Port District shall achieve compliance with Directive No. 1 of this Addendum in accordance with the following time schedule:

   a) Obtain a decision from the Cypress Mines by March 1, 1993 on 1) whether or not the company will accept or reject the dredged material; 2) the limiting sediment copper concentration the company will accept; and 3) the volume of dredged material the company will accept.

   b) Submit complete applications (including the supplemental report of waste discharge information requested in the Regional Boards letter dated November 30, 1992), by March 1, 1993, for all permits and other governmental approvals needed to implement cleanup to the 1,000 mg/kg (dry weight) copper cleanup level.

   c) Submit a plan, by March 1, 1993, including a detailed description of the activities to be conducted and a time schedule for completion of each task, to complete cleanup to the 1,000 mg/kg (dry weight) copper cleanup level. Implementation of the plan shall be carried out in accord with Directive(s) 2.d - 2.g unless otherwise directed by the Regional Board Executive Officer.

   d) Initiate dredging of copper contaminated sediment by October 1, 1993.

   e) Complete dredging of copper contaminated sediment by February 1, 1994.

   f) Submit Results of the Post Cleanup Sampling Plan by April 1, 1994.

g) Complete cleanup of contaminated sediment to the satisfaction of the Regional Board Executive Officer by April 1, 1994.

Provision

1. Directive Nos. 4.c. of Addendum No. 6 and Directive Nos. 2, 3.d, 3.e, 3.f and 3.g of Addendum No. 7 are hereby rescinded.

2. This Addendum does not sanction violations of Directive 4(c) of Addendum No. 6 and Directive 3(d) of Addendum No. 7 of Cleanup and Abatement Order No.85-91 occurring prior to the issuance of this Addendum. This Addendum does not relieve the Port District or Paco Terminals from potential administrative or judicial civil liabilities for violations of Directive 4(c) of Addendum No. 6 and Directive 3(d) of Addendum No. 7 of Cleanup and Abatement Order No.85-91 occurring prior to the issuance of this Addendum.

Arthur L. Coe
Executive Officer

Date Issued: December 8, 1992

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 7
TO
CLEANUP AND ABATEMENT ORDER NO. 85-91

PACO TERMINALS INC.
SAN DIEGO UNIFIED PORT DISTRICT

SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region, (hereinafter Regional Board) finds that:

1. On December 17, 1985, the Regional Board Executive Officer issued Cleanup and Abatement Order No. 85-91, Paco Terminals Inc., National City, San Diego County. Order No. 85-91 was issued to Paco terminals Inc. (Paco terminals) for violations of Order Nos. 79-72 and 84-50, NPDES Permit No. CA0107930. Order Nos. 79-72 and 84-50 contained waste discharge requirements regulating the storage and loading of copper ore at the San Diego Unified Port District`s (Port District's) 24th Street Marine Terminal.

2 On November 13, 1987, The Regional Board Executive Officer issued Addendum No. 1 to Cleanup and Abatement Order No. 85-91 and, on November 21, 1988, the Regional Board Executive Officer issued Addendum No. 2 to Order No. 85-91.

3. On February 27, 1989, the Regional Board adopted Addendum No. 3 to Cleanup and Abatement Order No. 85-91. Addendum No. 3 named the San Diego Unified Port District as a responsible party under Cleanup and Abatement Order No. 85-91.

4. On January 19, 1990, the Regional Board Executive Officer issued Addendum No. 4 to Cleanup and Abatement Order No. 85-91. Addendum No. 4 required Paco Terminals and the Port District to evaluate copper contamination at the 24th Street Marine Terminal site and complete cleanup of any contamination at the site by September 1, 1990.

5. On November 5, 1990, the Regional Board adopted Addendum No.5 to Cleanup and Abatement Order No. 85-91. Addendum No. 5 established a revised time schedule for cleanup of copper contaminated sediment from San Diego Bay adjacent to the 24th Street Marine Terminal.

6. On January 28, 1991, the Regional Board adopted Addendum No.6 to Cleanup and Abatement Order No. 85-91. Addendum No. 6 established a revised time schedule for cleanup of copper contaminated sediment from San Diego Bay adjacent to the 24th Street Marine Terminal. Directive 4(b) of Addendum No. 6 required Paco Terminals and the Port District to submit a

plan and time schedule by August 1, 1991 for cleanup of the contaminated sediment to a sediment copper concentration less than 1000 mg/kg. Directive 5 of Addendum No. 6 allowed the Port District and Paco Terminals to develop additional technical information to support a less stringent sediment copper cleanup objective provided that that the information was submitted by August 1, 1991. Directive 5 provided that the Regional Board would amend the findings and directives of Cleanup and Abatement Order No. 85-91 to reflect any necessary changes based on information submitted under Directive No. 5.

7. On April 11, 1991 the State Water Resources Control Board adopted the **Water Quality Control Plan for Enclosed Bays and Estuaries of California** (Enclosed Bays and Estuaries Plan). The provisions of the Bays and Estuaries Plan, including the numerical water quality objectives apply to the waters of San Diego Bay. The Bays and Estuaries Plan contains the following applicable copper water quality objective for the protection of saltwater aquatic life.

Constituent	Unit	1-Hour Average
Copper	µg/L	2.9

8. On August 1, 1991 a report entitled **REMEDIAL ACTION ALTERNATIVES FOR NATIONAL CITY MARINE TERMINAL** prepared by Woodward-Clyde Consultants on behalf of the San Diego Unified Port District was submitted to the Regional Board. The report was submitted in response to Directive 4(b) of Addendum No. 6. The report also presented an alternate cleanup strategy pursuant to Directive 5 of Addendum No. 6.

9. On November 22, 1991 Mr. David Hopkins of Hillyer and Irwin, counsel for the Port District filed a document entitled **SAN DIEGO UNIFIED PORT DISTRICT'S WRITTEN DIRECT TESTIMONY FOR REGIONAL BOARD HEARING ON DECEMBER 9, 1991 REGARDING CLEANUP LEVEL AND ADJUSTMENT OF ADDENDUM NO. 6 TIME LINES.** This document indicated that based on the information contained in the August 1 Woodward-Clyde report the Port District was requesting the following:

   a) The cleanup level for copper be increased from 1,000 mg/kg (dry weight) to 4,000 mg/kg (dry weight)

   b) The April 1, 1993 compliance date for cleanup of the remediation completion should remain in place. However all intermediate compliance dates in Addendum No. 6 should be rescinded by the Board and no new intermediate

compliance dates should be set by the Regional Board at this time.

10. The August 1 Woodward Clyde report included the following significant findings and conclusions in support of increasing the cleanup level for copper from 1,000 mg/kg (dry weight) to 4,000 mg/kg (dry weight):

a) From 1979 to 1985 copper ore concentrate was stockpiled and loaded onto ships at the National City Marine Terminal. The copper ore concentrate is a processed form of naturally occurring cupric ferrous sulfide (chalcopyrite) containing approximately 25 to 30 percent copper. Elevated concentrations of copper in the sediments near the wharf of the NCMT were found by the Woodward-Clyde Study to range as high as 58,269 mg/kg (dry weight). The estimated volume of sediments exceeding copper concentrations between 1,000 - 2,000 mg/kg (dry weight) is 13,200 yd^3. The estimated volume of sediments exceeding a copper concentration of 2,000 mg/kg (dry weight) is 9,800 yd^3.

b) A wide variety of well-known chemical reactions occur in aquatic sediments and convert copper to non-toxic forms. The Woodward Clyde report cited various studies indicating that the copper in the copper ore concentrate in the anoxic (oxygen free) sediments of san Diego Bay would be expected to be stable, highly insoluble and thus largely unavailable to affect aquatic life. The anoxic sediments would include those immediately beneath the thin oxidized layer at the sediment surface. When in contact with dissolved oxygen, such as would be found at the surface of the sediments or in the water column the copper ore concentrate could be slowly oxidized and solubilized. In oxic (oxygen containing) environments, copper can be readily removed from solution through a variety of precipitation reactions; copper also tends to strongly sorb onto sediment particles. Precipitated and sorbed species of copper are largely unavailable to aquatic life.

c) Comparison of recent data with that collected in 1989 provides some indication that the copper may be moving deeper into the sediments. This would be expected because of the higher specific gravity of the ore particles as compared to the typical particles in the marine sediments. According to the Merk Index (1983) cupric ferrous sulfide (chalcopyrite) has a density of 4.1 to 4.3 which makes it considerably heavier than

normal marine sediment particles. The movement of the particles deeper in to the sediment would further decrease the availability of the copper to aquatic life because of the anoxic conditions found in the deeper sediments.

d) The Woodward Clyde report acknowledges that the substantially elevated sediments in the vicinity of the NCMT was largely derived from the copper ore transfer activities that occurred at the site. However, other sources of copper (*e.g.* power plants, stormwater runoff, historical discharges of domestic wastewater, copper based antifoulant paints applied to the hulls of ships). The forms of copper contributed from at least some of those sources, in particular antifouling paints are expected to be considerably more available to aquatic organisms than the copper from the copper ore concentrate.

e) In 1986 Westec, consultant for Paco Terminals Inc. reported concentrations of copper in the water near the NCMT, 1 and 2 meters above the sediment at high and low tides in an area with a copper sediment concentration of 19,800 mg/kg (dry weight). Westec reported the total copper concentration to be between 3 to 33 µg/L; the soluble copper concentration was reported to be between <2 to 8 µg/L. Dissolved copper concentrations in other parts of San Diego Bay overlying sediments with much lower copper concentrations were found to be of the same relative magnitude as that found by Westec. This data was cited as indicating that the higher sediment copper concentrations at NCMT are not significantly affecting water column copper concentrations.

f) The Westec 1986 study cited in Finding 10(e) above indicates that the concentrations of copper in the water column exceed currently applicable 2.9 µg/L copper water quality objective. However the water quality objective was cited as being more restrictive than what is necessary to protect beneficial uses in San Diego Bay because:

- The objective applies to total concentration of copper irrespective of availability; and
- Organisms can be exposed to levels of concentrations of copper higher than the objective for periods of time considerably greater than one hour without adverse impact. The exposure duration

of water column organisms to sediment associated contaminants would be expected to be considerably shorter than the chronic exposure duration.

g) The soluble copper defined in the Westec Study cited in Finding 10(e) was the copper that passed through a 0.45 µ pore-size filter. While that technique is commonly used to separate "soluble chemical forms, appreciable amounts of particulate and colloidal matter can pass through such a filter and be included in the fraction quantified as "soluble". Particulate forms of copper are typically not toxic; thus the Westec analysis likely overstated the amount of copper in true solution and available to cause toxicity to aquatic life.

h) The 2.9 µg/L copper water quality objective was developed on the basis of toxicity to the embryos of the blue mussel (Mytilus edulus). Mytilus edulus currently live in the NCMT study area; thus the concentrations of copper in the water column are not sufficient to prevent the existence or preclude the development of larval forms of that organism.

i) The 1986 and 1987 Westec studies reported concentrations of soluble copper in interstitial waters (the water between the particles that make up the bay bottom sediments) ranging from <2 to 480 µg/L. These concentrations occurred in the NCMT study area where bay sediments had copper concentrations between about 13,000 and 23,900 mg/kg. There can be large concentrations of copper ore that are not contributing to the soluble copper found in the interstitial water. The test used by Westec to measure soluble copper in the interstitial water may have resulted in the inclusion of appreciable amounts of nonsoluble particulate copper. This form of copper would not be available to affect aquatic life. The soluble copper in the interstitial waters also likely included some non available soluble forms. Thus the remediation objective of 1000 mg/kg of copper may have been more conservative than intended.

j) Toxicity tests were conducted on the NCMT area sediments using nine different standard organism types. The test organisms included shrimp, flat fish, sea urchin eggs and embryos, clams, worms, two different amphipods, fish larvae, and oyster larvae. Eight of the nine organism types tested exhibited no toxicity under standardized toxicity test conditions. The organism Rhepoxynius abronius exhibited a toxic response which was found to

be unrelated to the copper concentration in the sediment.

k) Studies of the numbers and types of organisms present in the sediment in the vicinity of the NCMT show that differences and similarities between numbers, types, and diversity of organisms in that area are not related to sediment copper concentrations.

l) Concentrations of copper in mussels planted in or collected from the NCMT area are elevated; however the copper concentrations are not significantly different from the concentrations in tissues of mussels taken from other areas of San Diego Bay.

11. The Woodward-Clyde report analyzed several alternatives to remediate the contaminated sediment including no action, capping, in-situ stabilization, coffer dam, and removal by dredging. Under the removal by dredging option, consideration was given to the dredge disposal sites of the Cypress Mines, ocean disposal, and Class I, II, and III landfills. The remedial action plan recommended in the Woodward-Clyde report is as follows:

a) Use a clamshell dredge to remove the sediment containing greater than 2,000 mg/kg (dry weight) copper; process the sediment as required for mine acceptance; and, transport the sediment by rail to Cypress Mines, Sierrita, Arizona.

b) Use a clam shell dredge to remove sediment containing 1,000 - 2,000 mg/kg (dry weight) copper and dispose of this material at an EPA/COE approved ocean disposal site.

This project will require a pilot study to develop techniques appropriate for ensuring mine acceptance and determining what quantity of water (if any) must be processed prior to loading the dewatered spoil in rail cars. Cost of the recommended remedial action plan including pilot study is estimated at $4,500,000 to $5,000,000 (in 1991 dollars).

If ocean disposal is not feasible for part b above, the cost of sending all dredged material to the mine is estimated at $6,000,000 (in 1991 dollars).

If the material cannot be accepted by Cypress Mines, the proposed alternative remedial action plan is:

a) Dredged material would be used as fill behind a bulkhead to be constructed adjacent to the existing marginal wharf. Cost for this action is estimated to be $2,600,000 or $3,700,000 (in 1991 dollars) depending upon bulkhead dimensions and type of sheet pile construction (cantilevered or anchored) installed.

b) If any material qualifies as hazardous under California Health and Safety Code, it would be disposed in Class I Landfill at an approximate cost of $360 per cubic yard.

12. The dredging of the contaminated sediment will generate environmental impacts including increases in turbidity, resuspension of copper, and loss of infauna and burrowing fish within the dredge area. These impacts are likely to be significant and not mitigateable within the dredge area; a situation typical of all dredge projects. Water quality impacts such as turbidity will be short in duration lasting only as long as the dredge project. The concentrations of total copper in the water column in the vicinity of the dredging operations are expected to increase for the short period of time associated with the dredge project. However, it is unlikely that the concentrations of toxic forms of copper would be increased sufficiently to be adverse to aquatic life in the water column in the vicinity of the terminal or elsewhere. Benthic biota currently inhabiting the dredge area will be lost, but a similar biological community is expected to recolonize the dredged site within a year or two.

13. Some preventative measures will be taken to ensure minimum impact to the bay by the dredging. The redistribution of suspended particulates may be controlled and contained with the dredge area with silt curtains, various dredging procedures (e.g., the rate the dredge bucked is recovered), and/or a water tight bucket. Any discharge of dredge return water to the bay must be in compliance with the Bays and Estuaries Plan. The effectiveness of these procedures can be readily monitored during dredging operations. If turbidity exceeds expectations then the dredging can be stopped and modified to correct problems. Similarly, water samples can be collected to determine the concentration of chemicals in the water column for comparison with applicable water quality standards. This approach focuses on early monitoring of the dredge operation to identify and resolve potential problems in the dredge process before water quality or nearfield biota and habitats are adversely affected. Consequently, any problems identified by the monitoring program will need to be rectified by the dredger before dredging continues. The

implementation of these types of procedural and monitoring controls on the dredge operation can minimize significant impacts beyond the area of the dredge footprint.

14. The Regional Board, in determining the appropriate level of cleanup level in this matter, must comply with the Bays and Estuaries Plan and the State Water Resources Control Board's Resolution 68-16, "Statement of Policy with Respect to Maintaining High Quality of Water in California" This policy provides that existing water quality be maintained when it is reasonable to do so. This policy further provides that any change in water quality 1) be consistent with maximum public benefit, 2) will not unreasonably affect beneficial uses, and 3) will not result in water quality less than that prescribed in the policies. The Regional Board is also guided by the Environmental Protection Agency's antidegradation policy contained in 40 CFR 131.12. This policy provides in part that existing water quality be maintained and protected unless the State finds... that allowing the lower water quality is necessary to accommodate important economic or social development....

15. On April 4, 1990 the State Water Resources Control Board adopted the **1990 Water Quality Assessment (WQA).** San Diego Bay is listed in the State Board's WQA as having impaired water quality due to high levels of four pollutants: copper, mercury, tributyltin (TBT), and polychlorinated biphenyls (PCB's). As a result San Diego Bay has been placed on several Clean Water Act - mandated lists of impaired water bodies. These lists are the 40 CFR 131.11 list (water body segments which may be affected by toxic pollutants); Clean Water Act Section 303(d) list (water quality limited segments where objectives may be attainable with BAT/BCT); the Clean water Act Section 304(l) list (the "Long List" of water bodies , where narrative or numeric objectives are violated or beneficial uses are impaired); and the Clean Water Act Section 319 list of surface waters with nonpoint source problems. The beneficial uses that are considered impaired are ocean commercial and sport fishing, shellfish harvesting, and marine habitat.

16. As described in Finding 9, the Port District has requested that the April 1, 1993 compliance date for cleanup of the remediation completion remain in place. However, the Port District further requested that all intermediate compliance dates in Addendum No. 6 should be rescinded by the Board and no new intermediate compliance dates should be set by the Regional Board at this time. The Regional Board believes

that a time schedule, including both final and intermediate compliance dates, should always be included in a cleanup and abatement order unless there is a lack of information on which to base a schedule. The Woodward-Clyde report presented a time schedule for completion of the remediation project based on existing information. The Regional Board has considered this time schedule in establishing the compliance dates contained in this addendum.

IT IS HEREBY ORDERED That, pursuant to California Water Code Section 13304, Paco Terminals and the Port District shall Comply with the following:

1. Directive Nos. 4.d and 4.e of Addendum No. 6 to Cleanup and Abatement Order No. 85-91 are hereby rescinded.

2. Paco Terminals and the Port District shall reduce the sediment copper concentration in the affected portion of San Diego Bay to a sediment copper concentration less than 4,000 mg/kg (dry weight).

3. Paco Terminals and the Port District shall achieve compliance with Directive No. 2 of this Addendum in accordance with the following time schedule:

	Requirement	Completion Date
a.	Submit the results of the sediment screening pilot study for the mine process.	April 1, 1992
b.	Obtain a decision from the Cyprus Mines to accept or reject the dredged material.	May 1, 1992
c.	Submit a post-cleanup sampling plan to verify the attainment of the final cleanup level.	August 1, 1992
d.	Initiate dredging of copper contaminated sediment.	October 1, 1992
e.	Complete dredging of copper contaminated sediment.	February 1, 1993
f.	Submit results of the post-cleanup sampling plan.	April 1, 1993

	Requirement	Completion Date
g.	Complete cleanup of contaminated sediment in accordance with the selected cleanup plan to the satisfaction of the Regional Board.	April 1, 1993

PROVISION

1. Pursuant to Section 13304 of the Water Code, Paco Terminals and the Port District are hereby notified that the Regional Board is entitled to, and will, seek reimbursement for all reasonable costs actually incurred by the Regional Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remediation action, required by Cleanup and Abatement Order No. 85-91 and Addenda thereto. Reimbursable costs are costs incurred by the Regional Board following December 9, 1991. Upon receipt of a billing statement for such costs, Paco Terminals and the Port District shall reimburse the Regional Board.

2. The Regional Board will reconsider the deadlines in the time schedule included in this order if circumstances beyond the control of the discharger cause delays in compliance with the schedule.

I, Arthur L. Coe, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Addendum adopted by the California Regional Water Quality Control Board, San Diego Region, on December 9, 1991.

Arthur L. Coe
Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 6
TO
CLEANUP AND ABATEMENT ORDER NO. 85-91

PACO TERMINALS, INC.
SAN DIEGO UNIFIED PORT DISTRICT

SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board) finds that:

1. On December 12, 1985, the Regional Board Executive Officer issued Cleanup and Abatement Order No. 85-91, Paco Terminals Inc., National City, San Diego County. Order No. 85-91 was issued to Paco Terminals, Inc. (Paco Terminals) for violations of Order Nos. 79-72 and 84-50, NPDES Permit No. CA0107930. Order Nos. 79-72 and 84-50 contained waste discharge requirements regulating the storage and loading of copper ore at the San Diego Unified Port District's (Port District's) 24th Street Marine Terminal.

2. On November 13, 1987, the Regional Board Executive Officer issued Addendum No. 1 to Cleanup and Abatement Order No. 85-91 and, on November 21, 1988, the Regional Board issued Addendum No. 2 to Order No. 85-91.

3. On February 27, 1989, the Regional Board adopted Addendum No. 3 to Cleanup and Abatement Order No. 85-91. Addendum No. 3 named the San Diego Unified Port District as a responsible party under Cleanup and Abatement Order No. 85-91.

4. On January 19, 1990, the Regional Board Executive Officer issued Addendum No. 4 to Cleanup and Abatement Order No. 85-91. Addendum No. 4 required Paco Terminals and the Port District to evaluate copper contamination at the 24th Street Marine Terminal and complete cleanup of any contamination at the site by September 1, 1990.

5. On November 5, 1990, the Regional Board adopted Addendum No. 5 to Cleanup and Abatement Order No. 85-91. Addendum No. 5 established a revised time schedule for cleanup of copper contaminated sediment from San Diego Bay adjacent to the 24th Street Marine Terminal.

6. Monitoring of the copper ore contaminated sediment in San Diego Bay adjacent to the 24th Street Marine Terminal is necessary to determine if any dispersion of the copper ore or adverse effects on the beneficial uses of San Diego Bay are occurring until such time as cleanup is complete.

7. The copper ore discharged to San Diego Bay from the 24th Street Marine Terminal was in the form of copper concentrate, a rendered form of cupric ferrous sulfide ore known as chalcopyrite. This form of ore contains constituents other than copper, including silver, lead, zinc, mercury, and arsenic.

8. Beginning in January, 1990, Paco Terminals and the Port District have been negotiating with several mining companies to examine the feasibility of removing copper contaminated sediment from San Diego Bay, transporting the sediment to a copper production facility, and extracting the copper ore from the Bay sediments. The mining companies have determined that sediment samples will need to be collected and analyzed to determine if copper can be extracted from the Bay sediments. Subsequent to the adoption of Addendum No. 5 to Order No. 85-91, Paco Terminals and the Port District requested that the compliance date for informing the Regional Board whether or not this cleanup alternative will be pursued be extended approximately one month.

9. At the time when Addendum No. 5 to Cleanup and Abatement Order No. 85-91 was issued, Paco Terminals had filed for, and was in the process of obtaining, bankruptcy status. The compliance dates contained in Addendum No. 5 were developed based on a time schedule with which the Port District alone could comply. On January 4, 1991, the Regional Board received notice that the bankruptcy case for Paco Terminals was dismissed by the court on December 28, 1990. Therefore, the compliance dates contained in Addendum No. 5 should be modified to reflect the fact that Paco Terminals is no longer involved in bankruptcy proceedings.

10. This enforcement action is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000, et seq.) in accordance with Section 15321, Chapter 3, Title 14, California Administrative Code.

IT IS HEREBY ORDERED That, pursuant to California Water Code Section 13304, Paco Terminal and the Port District shall comply with the following:

1. Directive Nos. 2, 3, and 4 of Addendum No. 5 to Cleanup and Abatement Order No. 85-91 are hereby rescinded.

2. Paco Terminals and the Port District shall submit, no later than February 15, 1991, a monitoring program designed to identify changes in the location and biological availability of the sediment contaminants. The monitoring program shall be implemented upon approval of the Regional Board Executive Officer. The monitoring program shall, at a minimum, include the following elements:

   a. Lateral and Vertical Distribution of Contaminants

      Semiannually, core samples shall be collected from the stations identified in Part c. below to detect changes in the lateral distribution of copper ore within bay sediments. Analyses shall be performed at several depths within the core samples in order to identify changes within the vertical distribution of the contamination. All core samples shall be analyzed for copper. Once per year, silver, lead, zinc, mercury, and arsenic shall also be analyzed at each station. This analysis may be limited to the portion of each core sample which possesses the highest copper concentration.

   b. Biological Availability

      (1) Semiannually, sediment samples shall be collected at each monitoring station in Part c. below and analyzed for toxicity using either whole sediment or elutriate tests. A minimum of two invertebrate chronic toxicity tests should be performed, including an amphipod survival and reburial test, and a bivalve larvae survival and shell abnormality test.

      (2) If the results of the invertebrate tissue analysis indicate elevated levels of copper, mercury, silver, lead, zinc, or arsenic, the bioaccumulation sampling shall be expanded to include the following:

         Bioaccumulation sampling shall be conducted in the vicinity of the monitoring stations in Part c. below to determine if contaminants are being accumulated in the food chain. Species to be analyzed shall include a) two species of water column fish, preferably a

forage species like topsmelt (Athirinoos affinis) which is fed on by the California least tern, and a predator species; b) a bottom dwelling fish; c) a water column bivalve; and d) a common benthic invertebrate. Tissue should be analyzed for the following constituents: copper, silver, lead, zinc, mercury, and arsenic.

c. Monitoring stations

The monitoring program shall include a description of all sampling stations and a map showing the location of all stations. Paco Terminals and the Port District shall collect and analyze samples from the approved station locations in accordance with the above monitoring program.

d. Monitoring Report Schedule

Monitoring reports shall be submitted in accordance with the following schedule:

Monitoring Period	Report Frequency	Report Due
January - June	Semiannual	July 30
July - December	Semiannual	January 30
January - December	Annual	January 30

3. Paco Terminals and the Port District shall reduce the sediment copper concentration in the affected portion of San Diego Bay to a sediment copper concentration less than 1000 mg/kg.

4. Paco Terminals and the Port District shall achieve compliance with Directive No. 3 of this Order in accordance with the following time schedule:

Requirement	Completion Date
a. Submit the results of the mining companies pilot project as to whether the mines will accept the copper contaminated sediment material for extraction of copper ore.	April 1, 1991

b.	If the cleanup alternative described in Finding No. 8 of this Addendum is pursued, submit a description of the dredging activities which will take place, the permits and other governmental approvals needed, and a time schedule for completing each task. If the cleanup alternative described in Finding No. 8 of this Addendum is not pursued, submit a plan for cleanup of contaminated sediment to the indicated cleanup level. The cleanup plan shall include a description of all dredging and other cleanup activities to be conducted, the permits and other governmental approvals needed, and a time schedule for completion of each task.	August 1, 1991
c.	Submit all necessary applications for permits and other governmental approvals needed to implement the selected cleanup method.	December 1, 1991
d.	Submit a post-cleanup sampling plan to verify the attainment of the final cleanup level.	August 1, 1992
e.	Submit results of the post-cleanup sampling plan and complete cleanup of contaminated sediment in accordance with the selected cleanup plan to the satisfaction of the Regional Board.	April 1, 1993

5. In addition to the cleanup alternatives described in Directive 4, Paco Terminals and the Port District may submit by August 1, 1991, an alternate cleanup strategy. This alternative cleanup strategy shall include a description of the remediation activities to be conducted and a time schedule for completion of each task. This alternative strategy must also comply, to the satisfaction of the Regional Board, with the following criteria:

a. The proposed copper concentration to be attained in the contaminated sediment in San Diego Bay will not alter the water quality of San Diego Bay to a degree which unreasonably affects the beneficial uses of San Diego Bay. To determine expected impacts on the beneficial uses of San Diego Bay, information on the biological effects of the copper contaminated sediments, including acute and chronic toxicity, and bioaccumulation, will be necessary. The biological effects study should include the sampling and analyses of forage fish, bottom fish, benthic invertebrates and water column invertebrates. Numbers of species and individuals, and tissue concentrations, should be determined in the copper contamination area and in suitable reference sites. Using biological and chemical information, a risk assessment should be performed to evaluate if any beneficial uses of San Diego Bay are being adversely affected, and if so, what cleanup level would be expected to protect the beneficial uses.

b. The proposed copper concentration to be attained in the contaminated sediment in San Diego Bay will comply with State Water Resources Control Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California" and the U.S. Environmental Protection Agency's Antidegradation Policy contained in 40 CFR 131.12.

c. The proposed copper concentration to be attained in the contaminated sediment in San Diego Bay will comply with State Water Resources Control Board's "Water Quality Control Policy for the Enclosed Bays and Estuaries of California, May 1974," and, upon its adoption by the State Board, the "Water Quality Control Plan for Enclosed Bays and Estuaries of California."

The findings and directives of Cleanup and Abatement Order No. 85-91 will be modified to reflect any necessary changes based on information submitted under this Directive.

PROVISIONS

1. Paco Terminals and the Port District shall submit to the Regional Board on or before each completion date a report of compliance or noncompliance with the specific task. If noncompliance is being reported, the reasons for such noncompliance and an alternative compliance schedule shall be stated. The Regional Board shall be notified by letter upon return to compliance with the time schedule.

I, Arthur L. Coe, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Addendum adopted by the California Regional Water Quality Control Board, San Diego Region, on January 28, 1991.

Arthur L. Coe
Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 5
TO
CLEANUP AND ABATEMENT ORDER NO. 85-91

PACO TERMINALS, INC.
SAN DIEGO UNIFIED PORT DISTRICT

SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board) finds that:

1. On December 12, 1985, the Regional Board Executive Officer issued Cleanup and Abatement Order No. 85-91, Paco Terminals Inc., National City, San Diego County. Order No. 85-91 was issued to Paco Terminals, Inc. (Paco Terminals) for violations of Order Nos. 79-72 and 84-50, NPDES Permit No. CA0107930. Order Nos. 79-72 and 84-50 contained waste discharge requirements regulating to the storage and loading of copper ore at the San Diego Unified Port District's (Port District's) 24th Street Marine Terminal.

2. On November 13, 1987, the Regional Board Executive Officer issued Addendum No. 1 to Cleanup and Abatement Order No. 85-91 and, on November 21, 1988, the Regional Board issued Addendum No. 2 to Order No. 85-91.

3. On February 27, 1989, the Regional Board adopted Addendum No. 3 to Cleanup and Abatement Order No. 85-91. Addendum No. 3 named the Port District as a responsible party under Cleanup and Abatement Order No. 85-91.

4. On January 19, 1990, the Regional Board Executive Officer issued Addendum No. 4 to Cleanup and Abatement Order No. 85-91. Addendum No. 4 required Paco Terminals and the Port District to evaluate copper contamination at the 24th Street Marine Terminal and complete cleanup of any contamination at the site by September 1, 1990.

5. Addendum No. 2 to Order No. 85-91 contained a time schedule for removal of copper contaminated sediment from a portion of San Diego Bay by dredging. The compliance dates stated in the time schedule were based on a proposal to dispose of contaminated dredged material at an ocean disposal site approved by the US Army Corps of Engineers and the Environmental Protection Agency (EPA). In January, 1990,

Paco Terminals and the Port District elected not to pursue ocean disposal of contaminated sediments due to a preliminary indication by EPA that ocean disposal was not a viable option. Therefore, it is necessary to modify the tasks and compliance dates listed in the time schedule contained in Directive No. 3 of Addendum No. 2 to Cleanup and Abatement Order No. 85-91.

6. Beginning in January, 1990, Paco Terminals and the Port District have been negotiating with a mining company to examine the feasibility of removing copper contaminated sediment from San Diego Bay, transporting the sediment to a copper production facility, and extracting the copper ore from the Bay sediments. The mining company has determined that sediment samples will need to be collected and analyzed to determine if copper can be extracted from the Bay sediments.

7. This enforcement action is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000, et seq.) in accordance with Section 15321, Chapter 3, Title 14, California Administrative Code.

IT IS HEREBY ORDERED That, pursuant to California Water Code Section 13304, Paco Terminal and the Port District shall comply with the following:

1. Directive Nos. 2 and 3 of Addendum No. 2 to Order No. 85-91 are hereby rescinded.

2. Paco Terminals and the Port District shall reduce the sediment copper concentration in the affected portion of San Diego Bay to a sediment copper concentration less than 1000 mg/kg.

3. Paco Terminals and the Port District shall achieve compliance with Directive No. 2 of this Order in accordance with the following time schedule:

Requirement		Completion Date
a.	Submit a decision on whether or not the cleanup alternative described in Finding No. 6 of this Addendum will be pursued.	February 1, 1991
b.	If the cleanup alternative described in Finding No. 6 is pursued, submit a description of the dredging activities which will take place, the permits and other governmental approvals needed, and a time schedule for completing each task.	November 1, 1991
c.	If the cleanup alternative described in Finding No. 6 is not pursued, submit a plan for cleanup of contaminated sediment to the indicated cleanup level. The cleanup plan shall include a description of all dredging and other cleanup activities to be conducted, the permits and other governmental approvals needed, and a time schedule for completion of each task.	December 1, 1991

4. In addition to the cleanup alternatives described in Directive 3, Paco Terminals and the Port District may submit by December 1, 1991, an alternate cleanup strategy. This alternative cleanup strategy shall include a description of the remediation activities to be conducted and a time schedule for completion of each task. This alternative strategy must also comply, to the satisfaction of the Regional Board, with the following criteria:

   a. The proposed copper concentration to be attained in the contaminated sediment in San Diego Bay will not alter the water quality of San Diego Bay to a degree which unreasonably affects the beneficial uses of San Diego Bay. To determine expected impacts on the beneficial uses of San Diego Bay, information on the biological effects of the copper contaminated sediments, including acute and chronic toxicity, and bioaccumulation, will

be necessary. The biological effects study should include the sampling and analyses of forage fish, bottom fish, benthic invertebrates and water column invertebrates. Numbers of species and individuals, and tissue concentrations, should be determined in the copper contamination area and in suitable reference sites. Using biological and chemical information, a risk assessment should be performed to evaluate if any beneficial uses of San Diego Bay are being adversely affected, and if so, what cleanup level would be expected to protect the beneficial uses.

b. The proposed copper concentration to be attained in the contaminated sediment in San Diego Bay will comply with State Water Resources Control Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California" and the U.S. Environmental Protection Agency's Antidegradation Policy contained in 40 CFR 131.12.

c. The proposed copper concentration to be attained in the contaminated sediment in San Diego Bay will comply with State Water Resources Control Board's "Water Quality Control Policy for the Enclosed Bays and Estuaries of California, May 1974," and, upon its adoption by the State Board, the "Water Quality Control Plan for Enclosed Bays and Estuaries of California."

The findings and directives of Cleanup and Abatement Order No. 85-91 will be modified to reflect any necessary changes based on information submitted under this Directive.

PROVISIONS

1. Paco Terminals and the Port District shall submit to the Regional Board on or before each completion date a report of compliance or noncompliance with the specific task. If noncompliance is being reported, the reasons for such noncompliance and an alternative compliance schedule shall be stated. The Regional Board shall be notified by letter upon return to compliance with the time schedule.

2. Paco Terminals and the Port District shall continue to submit quarterly cleanup status reports in accordance with Directive No. 3 of Addendum No. 1 to Cleanup and Abatement No. 85-91.

I, Arthur L. Coe, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Addendum adopted by the California Regional Water Quality Control Board, San Diego Region, on November 5, 1990.

Arthur L. Coe
Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 4
TO
CLEANUP AND ABATEMENT ORDER NO. 85-91

PACO TERMINALS INC.
SAN DIEGO UNIFIED PORT DISTRICT

SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board) finds that:

1. On December 12, 1985, the Regional Board Executive Officer issued Cleanup and Abatement Order No. 85-91, Paco Terminals Inc., National City, San Diego County. Order No. 85-91 was issued to Paco Terminals Inc. (Paco Terminals) for violations of Order Nos. 79-72 and 84-50, NPDES Permit No. CA0107930. Order Nos. 79-72 and 84-50 contained waste discharge requirements regulating the storage and loading of copper ore at the San Diego Unified Port District's (Port District's) 24th Street Marine Terminal.

2. On November 13, 1987, the Regional Board issued Addendum No. 1 to Cleanup and Abatement Order No. 85-91 and, on November 21, 1988, the Regional Board issued Addendum No. 2 to Order No. 85-91.

3. On February 27, 1989, the Regional Board adopted Addendum No. 3 to Cleanup and Abatement Order No. 85-91. Addendum No. 3 named the Port District as a responsible party under Cleanup and Abatement Order No. 85-91.

4. The Comprehensive Water Quality Control Plan Report, San Diego Basin (9) (Basin Plan), contains the following Prohibition under the authority of Water Code Section 13243:

   "The dumping or deposition from shore or from vessels of oil, garbage, trash or other solid municipal, industrial or agricultural waste directly into waters subject to tidal action or adjacent to waters subject to tidal action in any manner which may permit it to be washed into the waters subject to tidal action is prohibited."

5. Paco Terminals ceased operations at the 24th Street Marine Terminal in December 1986. Order No. 84-50 expired on November 26, 1989, and Paco Terminals did not submit a renewal application for its NPDES permit. Hence, as owner of the facility, the Port District is partially responsible for potential waste discharges from the facility. As shown in Finding Nos. 6 through 10 of this Order, Regional Board staff inspections and a technical report prepared by the

Port District's consultant, copper ore is in the storm drains and at other areas at the 24th Street Marine Terminal.

6. By letter dated January 16, 1990, the attorney for the Port District, Mr. David Hopkins of Hillyer and Irwin, submitted a report prepared by Applied Geosciences, Inc., entitled **Hazardous Materials Investigation of Storm Drain System, National City Marine Terminal, National City, California.** The report was dated December 20, 1989. Applied Geosciences collected sediment samples from 15 sumps in 4 storm drain laterals at the 24th Street Marine Terminal and determined that the concentrations of copper in the sump sediments were all in excess of the hazardous waste limitation of 2,500 mg/Kg specified in Title 22 of the California Code of Regulations. The sediment copper concentrations ranged from 9,160 mg/Kg to 220,000 mg/Kg with a mean concentration of 84,300 mg/Kg. Applied Geosciences also collected two water samples from the storm drains. The dissolved copper concentrations of 570 ug/L and 1,300 ug/L in the water samples exceed the 6-month median copper concentration limit of 3 ug/L for receiving waters contained in the **Water Quality Control Plan, Ocean Waters of California, 1988.** The Port District has reportedly installed plugs in the storm drains to prevent waste discharges to San Diego Bay through the storm drains.

7. On February 24, 1988, Regional Board staff inspected Paco Terminals and collected sediment samples from the dirt area immediately south of the 24th Street Marine Terminal (Area A) and from the strip of dirt between the paved area and San Diego Bay (Area B). Areas A and B are shown in Attachment 1 to this Order. The copper concentrations in Areas A and B were found to be as high as 16,564 mg/Kg and 239,120 mg/Kg, respectively. These results indicate that copper ore from the Paco Terminals operation has been discharged to those locations. Rainfall runoff could wash this material into San Diego Bay.

8. On March 21, 1988, Regional Board staff inspected Paco Terminals and collected sediment samples from the paved area near the uncovered storm drains at the 24th Street Marine Terminal (Area C). Area C is shown in Attachment 1 to this Order. The copper concentrations in Area C were found to be as high as 364,420 mg/Kg. These results indicate that copper ore from the Paco Terminals operation has been discharged to this location. Rainfall runoff could wash this material into San Diego Bay.

9. On May 26, 1989, Regional Board staff inspected Paco Terminals and collected sediment samples from the strip of dirt between the paved area and San Diego Bay (Area B) and near the pier face next to the container crane rails (Area D). Areas B and D are shown in Attachment 1 to this Order. The copper concentrations in Areas B and D were found to be as high as 61,400 mg/Kg and 5,190 mg/Kg, respectively, during this inspection. These results indicate that copper ore from the Paco Terminals operation has been discharged to those locations. Rainfall runoff could wash this material into San Diego Bay.

10. On November 1, 1989, Regional Board staff inspected Paco Terminals and collected sediment samples in the dirt area directly south of the 24th Street Marine Terminal. The samples were collected in Area C shown in Attachment 1 to this Order. The copper concentrations in Area C were found to be as high as 166,000 mg/Kg. These results indicate that copper ore from the Paco Terminals operation has been discharged to this location. The sample results confirmed that copper ore had been discharged to Area C as discussed in Finding No. 8 of this Order in an area where rainfall runoff would wash this material into San Diego Bay.

11. The copper ore wastes at the 24th Street Marine Terminal described in Finding Nos. 6 through 10 of this Order have been deposited adjacent to waters subject to tidal action (e.g., San Diego Bay) in a manner which permit the wastes to be washed into San Diego Bay in violation of the Basin Plan Prohibition described in Finding No. 4 of this Order.

12. This enforcement action is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000, et seq.) in accordance with Section 15321, Chapter 3, Title 14, California Administrative Code.

IT IS HEREBY ORDERED that, pursuant to California Water Code Section 13304, Paco Terminals and the Port District shall comply with the following:

1. Paco Terminals and the Port District shall not deposit or discharge copper into San Diego Bay or at any place where it would be eventually transported into San Diego Bay.

2. Paco Terminals and the Port District shall submit a report by March 15, 1990, describing the areal and vertical extent of copper contamination at the 24th Street Marine Terminal including dirt areas, paved areas and storm drains. The report shall include a remediation plan and time schedule to

cleanup the copper ore waste from the 24th Street Marine Terminal site.

3. Upon approval of the remediation plan by the Regional Board Executive Officer, Paco Terminals and the Port District shall award bids by May 1, 1990, for the completion of cleanup activities. Paco Terminals and the Port District shall submit a report by May 1, 1990, regarding completion of this task.

4. Paco Terminals and the Port District shall commence site cleanup activities by June 1, 1990. Paco Terminals and the Port District shall submit a report by June 1, 1990, regarding completion of this task.

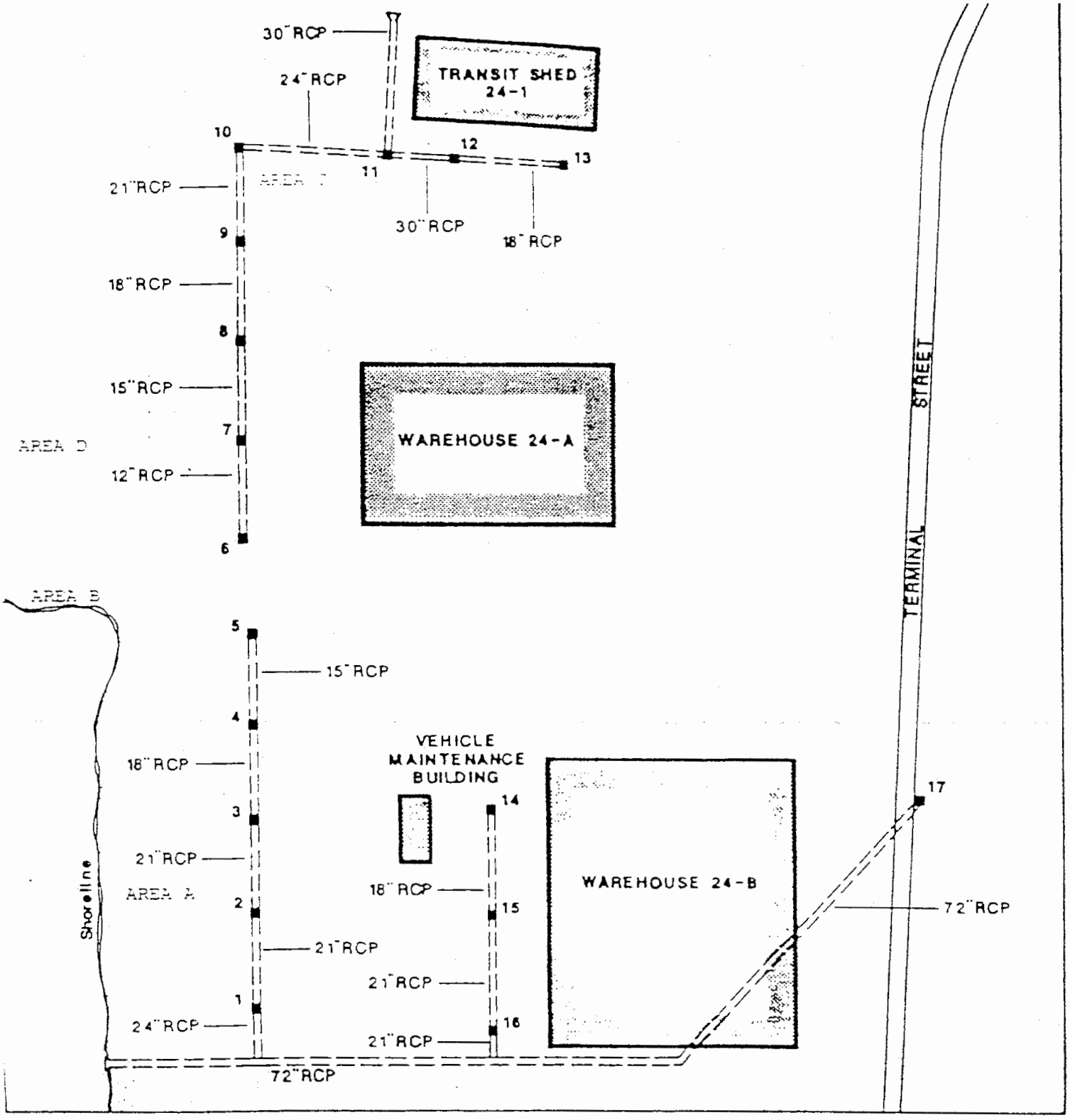
5. Paco Terminals and the Port District shall complete the site cleanup activities approved under Directive No. 2 of this Order by September 1, 1990. Paco Terminals and the Port District shall submit a report by September 1, 1990, regarding completion of this task.

Ordered By: Ladin H. Delaney

Ladin H. Delaney
Executive Officer

Date: January 19, 1990

ATTACHMENT 1



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN DIEGO REGION

ADDENDUM NO. 3 TO ORDER NO. 85-91

PACO TERMINALS INC.
SAN DIEGO UNIFIED PORT DISTRICT

SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board) finds that:

1. On December 12, 1985, the Regional Board Executive Officer issued Cleanup and Abatement Order No. 85-91, **Paco Terminals Inc., National City, San Diego County.** Order No. 85-91 was issued to Paco Terminals Inc. (Paco Terminals) for violations of Order Nos. 79-72 and 84-50, NPDES Permit No. CA0107930. Order Nos. 79-72 and 84-50 contained waste discharge requirements regulating the storage and loading of copper ore at the San Diego Unified Port District's (Port District's) 24th Street Marine Terminal.

2. On November 13, 1987, the Regional Board issued Addendum No. 1 to Cleanup and Abatement Order No. 85-91 and, on November 21, 1988, the Regional Board issued Addendum No. 2 to Order No. 85-91.

3. By letter dated September 1, 1988, Paco Terminals requested that the Regional Board amend Cleanup and Abatement Order No. 85-91 to name the Port District as a responsible party.

4. On January 23, 1989, and February 27, 1989 the Regional Board held hearings to consider amending Cleanup and Abatement Order No. 85-91 to include the Port District as a responsible party.

5. Evidence introduced in the hearing on January 23, 1989, and February 27, 1989 including, but not limited to, the Regional Board files, written submittals by Paco Terminals and the Port District, and oral testimony support the following findings:

   (a) From March 1978 through January 1988 Paco Terminals leased a portion of the Port Districts 24th Street Marine Terminal for Paco Terminals copper ore storage and loading operation;

(b) The Port District, at all relevant times, retained exclusive control over 120 feet of land between the end of Paco Terminals leasehold and the pier face;

(c) The Port District owned a container crane which was leased by Paco Terminals for the loading of copper ore onto vessels. The Port District routinely maintained an electrician and a mechanic on-site in order to repair any problems with the crane;

(d) Problems with operation of the container crane resulted in accidental opening of the crane over the ships being loaded. Evidence indicates that the copper concentration in the loading area bay sediments are very elevated compared to background levels. This evidence supports the conclusion that problems with the functioning of the crane likely contributed to elevated copper concentrations in the loading area.

(e) The Port District also owned and controlled the storm drains on Paco Terminals leasehold;

(f) Copper was discharged and is still being discharged through the storm drains;

(g) The Port District knew of the potential for a discharge of copper ore to San Diego Bay from the leased premises and the land which remained in the Port District's exclusive control;

(h) The Port District had the ability under the lease agreements with Paco Terminals, as well as its ownership of the storm drain and land between Paco Terminal's leasehold and the pier face, to prevent the discharge of copper ore to San Diego Bay;

(i) Paco Terminals has terminated its lease with the Port District. Therefore, the Port District now has exclusive possession and control over the formerly leased premises.

6. Based upon the factors listed in Finding 5 above, the Regional Board finds that the Port District caused or permitted the discharge of copper ore to San Diego Bay in violation of the terms and conditions of Order No. 79-72 and 84-50, as described in detail in the findings of Cleanup and Abatement Order No. 85-91.

7. The Regional Board also finds that the Port District caused or permitted copper ore to be deposited where it was and probably will be discharged into San Diego Bay. This condition created and threatens to continue to create a condition of pollution as described in Finding No. 22 of Cleanup and Abatement Order No. 85-91.

8. This enforcement action is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000, et seq.) in accordance with Section 15321, Chapter 3, Title 14, California Administrative Code.

IT IS HEREBY ORDERED that, pursuant to California Water Code Section 13304:

1. Cleanup and Abatement Order No. 85-91 and Addenda are amended to add the Port District as a responsible party. The directives of Cleanup and Abatement Order No. 85-91 and Addenda shall hereafter be construed to refer to both Paco Terminals and the Port District unless otherwise stated. The title headings of Cleanup and Abatement Order No. 85-91 and addenda are amended to read **Paco Terminals Inc., San Diego Unified Port District, San Diego County.**

I, Ladin H. Delaney, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an addendum adopted by the California Regional Water Quality Control Board, San Diego Region, on February 27, 1989.

Ladin H. Delaney

Ladin H. Delaney
Executive Officer

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 2 TO CLEANUP AND ABATEMENT ORDER NO. 85-91

PACO TERMINALS, INC.
NATIONAL CITY
SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board) finds that:

1. On December 12, 1985, the Regional Board Executive Officer issued **Cleanup and Abatement Order No. 85-91, Paco Terminals, Inc., National City, San Diego County.** Order No. 85-91 contained findings establishing that copper ore loading and storage operations at Paco Terminals, Inc. had resulted in discharges of inorganic copper ore to San Diego Bay. The inorganic copper ore consisted of a rendered form of cupric ferrous sulfide ore known as chalcopyrite. The discharges of copper ore to San Diego Bay were in direct violation of discharge prohibitions contained in Order Nos. 79-72 and 84-50, **Waste Discharge Requirements for Paco Terminals, Inc., National City, San Diego County.** Order No. 85-91 directed Paco Terminals to submit a report identifying the lateral and vertical extent of copper ore in sediments near Paco Terminals and cost estimates associated with three cleanup alternatives to remove the copper ore from San Diego Bay.

2. On November 13, 1897, the Regional Board Executive Officer issued **Addendum No. 1 to Cleanup and Abatement Order No. 85-91, Paco Terminals, Inc., San Diego County.** Addendum No. 1 to Order No. 85-91 directed Paco Terminals to reduce the sediment copper concentration in San Diego Bay to less than 1000 mg/kg by January 3, 1989.

3. At the Regional Board meeting on November 16, 1987, the Regional Board directed that the following finding be included in Cleanup and Abatement Order No. 85-91:

> "Paco Terminals, Inc. and its officer and employees understand that failure to comply with any of the terms and conditions of Cleanup and Abatement Order No. 85-91 and Addendum No. 1 thereto may result in enforcement proceedings pursuant to applicable sections of the California Water Code. Although Paco Terminals, Inc. and its officers and employees agree to be bound by the terms and conditions of Cleanup and abatement Order No. 85-91 and Addendum No. 1 thereto, such agreement and compliance by Paco Terminals, Inc. and its officers and employees should not be considered or construed as an admission of any civil or criminal liability."

4. On February 4, 1988, Westec Services inc., submitted a report entitled **"Cleanup Plan For Copper Contaminated Sediments at the 24th Street Marine Terminal."** The report indicated that the cleanup operation would be completed by August 21, 1989, in three stages. The processes of mapping the dredge site and applying for a permit for ocean disposal of the sediment were to begin on February 8, 1988, and be completed by August 8, 1988. The

process of preparing bids for dredging was to begin on August 8, 1988, with actual dredging to begin on November 28, 1988. Dredging was to be done in four stages with post-dredging sampling to be done following each stage. The first stage was to dredge the area north of the storm drain followed by dredging the area west of the pierface. Each of these stages was to take 15 weeks. Six weeks of sediment sampling was to be done in the area north of the storm drain while dredging took place west of the pierface. If areas with excess copper were found north of the storm drain following the initial dredging, then these areas would be dredged following the initial dredging of the area west of the pierface. The sampling and re-dredging procedure was to have been repeated for the area west of the pierface.

5. By letter dated October 17, 1988, Westec Services, Inc., submitted "Revision No. 1 to Paco Terminals Cleanup Plan for Sediments at the 24th Street Marine Terminal." The revised cleanup operation is divided into five parts as follows:

    1) complete mapping of the dredge site by January 3, 1989,
    2) complete bioassay testing to determine the toxicity of the material by June 6, 1989;
    3) receive a permit for ocean disposal by August 8, 1989;
    4) complete initial removal of contaminated sediments by May 15, 1990; and
    5) conduct post-dredging survey to verify removal of contaminated sediments and submit report to Regional Board by June 30, 1990.

6. On August 22, 1988, the Army Corps of Engineers (ACOE) and the Environmental Protection Agency (EPA) approved the bioassay plan submitted by Westec. However, EPA reportedly withdrew its approval on September 12, 1988, and expressed concerns regarding the specific area (i.e., horizontal and vertical distribution of the dredge sediments) to be dredged. This has made it necessary to complete the mapping of the dredge site before the bioassay testing could be performed and a permit obtained. The original cleanup plan discussed in Finding No. 4 envisioned the mapping of the site being done independent of both the bioassay and permit application processes. The cleanup plan contained in the October 17, 1988, report delays final cleanup by 11 months as compared to the original cleanup plan submitted on February 4, 1988. Implementation of the October 17, 1988, cleanup plan would result in a delay of 17 months as compared to the schedule required by Addendum No. 1 to Cleanup and Abatement No. 85-91.

7. Paco Terminals has to date complied with the terms and conditions of Addendum No. 1 to Cleanup and Abatement Order No. 85-91. However, experience indicates that regulatory review and approval has been a lengthy process resulting in delays beyond the control of Paco Terminals.

8. The revised time schedule proposed by Paco Terminals in their October 17, 1988 report is based, in part, on estimates of the time required for regulatory review and approval of various aspects of the cleanup project. If the regulatory review process is shorter than that envisioned in the revised time schedule, then cleanup might be completed ahead of schedule. Conversely, if regulatory review requires more time than provided for by the revised time schedule which was incorporated into this order, then Paco Terminals may

not be able to comply with the time schedule contained in this addendum. Consequently, it may be necessary to lengthen or shorten the time schedule to reflect actual time spent by regulatory agencies in reviewing and approving various aspects of the cleanup project.

9. This enforcement action is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000, et seq.) in accordance with Section 15321, Chapter 3, Title 14, california Administrative Code.

IT IS HEREBY ORDERED That, pursuant to California Water Code Section 13304:

1. Directive Nos. 1 and 4 of Addendum No. 1 to Cleanup and Abatement Order No. 85-91 are hereby rescinded.

2. Paco Terminals, Inc. shall reduce the sediment copper concentration in the affected portion of San Diego Bay to a sediment copper concentration less than 1000 mg/kg by May 15, 1990.

3. Paco Terminals, Inc. shall achieve compliance with Directive No. 2 of this Order in accordance with the following time schedule:

Requirements	Completion Date
a. Submit revised Bioassay Plan with Sediment Map to ACOE and EPA	January 17, 1989
b. Submit Draft Bioassay Report to ACOE and EPA	April 25, 1989
c. Submit Dredge Permit Application to ACOE and EPA	June 13, 1989
d. Prepare Detailed Dredge Specifications	August 22, 1989
e. Select Dredge Contractor (sign contract)	September 19, 1989
f. Submit a Post-Cleanup Sampling plan to the Regional Board	October 17, 1989
g. Dredge Affected Area of San Diego Bay	May 15, 1990
h. Conduct Post-Dredging Survey to verify Removal of Material and submit Report to Regional Board	June 30, 1990

I, Ladin H. Delaney, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Addendum adopted by the California Regional Water Quality Control Board, San Diego Region, November 21, 1988.

Ladin H. Delaney

Ladin H. Delaney
Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 1 TO CLEANUP AND ABATEMENT ORDER NO. 85-91

PACO TERMINALS, INC.
NATIONAL CITY
SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board) finds that:

1. On December 12, 1985, the Regional Board Executive Officer issued **Cleanup and Abatement Order No. 85-91, Paco Terminals, Inc., National City, San Diego County.** Order No. 85-91 contained findings establishing that copper ore loading and storage operations at Paco Terminals Inc. had resulted in discharges of inorganic copper ore to San Diego Bay. The inorganic copper ore consisted of a rendered form of cupric ferrous sulfide ore known as chalcopyrite. The discharges of copper ore to San Diego Bay were in direct violation of discharge prohibitions contained in Order Nos. 79-72 and 84-50, **Waste Discharge Requirements for Paco Terminals Inc., National City, San Diego County.** Order No. 85-91 directed Paco Terminals to submit a report identifying the lateral and vertical extent of copper ore in sediments near Paco Terminals and cost estimates associated with three cleanup alternatives to remove the copper ore from San Diego Bay.

2. In March, 1986 Paco Terminals Inc. submitted a report entitled **An Evaluation of the Impact of Copper Ore in the Marine Environment in the Vicinity of Paco Terminals Inc. on the Beneficial Uses of San Diego Bay**, prepared by Westec Services Inc. (hereinafter referred to as the March, 1986 Westec Report). The March, 1986 Westec Report was submitted in response to Directive 1 of Cleanup and Abatement Order No. 85-91 and was a continuation of a previous report submitted by Paco Terminals Inc. to the Regional Board in September, 1985. The March, 1986 Westec Report presented an evaluation of the cost and feasibility of three alternative cleanup options, provided additional information on the vertical and horizontal distribution of copper contaminated sediments and presented an evaluation of the effects of the copper contaminated sediments on the marine habitat beneficial use (the beneficial use potentially most affected by the copper ore discharge) of San Diego Bay.

3. In August, 1985 and January, 1986 Westec Services Inc. conducted sediment sampling in San Diego Bay to establish the vertical and horizontal distribution of the copper ore in the bay sediments. The study area extended approximately 1 nautical mile north and south and 0.5 nautical miles west of Paco Terminals Inc.. The vertical profile of copper ore in the bay sediments was obtained by collecting core samples at 9 different sites in the study area. The vertical core sediment samples were collected to depths up to the maximum core penetration depth. The maximum vertical core sample depths ranged from 12 inches to 52 inches. The horizontal distribution of copper ore in the bay sediments was determined based on 34 station sites sampled in August, 1985 and 77 stations sampled in January, 1986.

4. One vertical core sample collected at Station G-16 immediately adjacent to the Paco Terminals Inc. pier face contained a copper concentration of 12,500 milligrams per kilogram (mg/kg) at the top portion and 4,780 mg/kg in the bottom portion at a depth of 40 inches. Copper concentrations determined at the remaining 8 sample sites located 240, 480, 720, 1500, and 3000 feet from the pier face ranged from 3.0 to 9.0 mg/kg. With the exception of the vertical core sample collected from Station G-16, the vertical core sample values showed that the copper contamination in the affected bay sediments decreased markedly with depth and thus was primarily a surface phenomena.

5. The surficial sediment samples collected to determine the surficial areal extent of the copper ore contamination revealed that copper concentrations at stations 9, 15, 16, 22, and 23 along the Paco Terminals Inc. pier face ranged from 2300 mg/kg to 28,600 mg/kg. A surface sediment sample collected at Station 8, adjacent to the mouth of a storm drain tributary to Paco Terminals Inc., had a copper concentration of 9300 mg/kg. Copper concentrations in sediment samples collected along the Paco Terminals Inc. pier face and adjacent to the storm drain pipe were markedly higher than elsewhere in the study area. Sample stations located from 250 to 750 feet from the pier face (Stations 10, 11, 12, 17, 18, 19, 24, and 26) had copper concentrations ranging from 47 mg/kg to 372 mg/kg. Sample stations located 1500 to 3000 feet from the pier face (Stations 13, 14, 20, 21, 27, and 28) had copper concentrations ranging from 29 mg/kg to 45 mg/kg. Sediment sample stations located approximately 0.5 miles to the north and south of Paco Terminals Inc. had copper concentrations ranging from 118 mg/kg to 141 mg/kg and 209 mg/kg to 325 mg/kg.

6. Directive 1(a) of Cleanup and Abatement Order No. 85-91 required Paco Terminals Inc. to examine the cost and feasibility of removal and/or treatment of the copper contaminated sediment to attain sediment copper concentrations essentially equivalent to the copper concentrations occurring prior to commencement of operations by Paco Terminals Inc.. In April, 1979 Regional Board staff collected sediment samples adjacent to 24th Street Marine Terminals, prior to the occupation of the site by Paco Terminals Inc.(The site was occupied by Paco Terminals Inc. in early 1980.) The six sediment samples collected by Regional Board staff at that time had copper concentrations ranging from 91.7 mg/kg to 177.9 mg/kg. The average copper concentration of the six sediment samples was 110 mg/kg.

7. Directive 1(a) of Cleanup and Abatement Order No. 85-91 stated that any other data obtained by Paco Terminals Inc. to describe the copper concentrations occurring in the sediments prior to 1980 would be considered if sufficient documentation were provided. The March, 1986 Westec Report stated that baseline copper concentrations were as high as 398 mg/kg in the vicinity of 24th Street Marine Terminal prior to the occupation of the site by Paco Terminals Inc.. This conclusion was based on bioassay studies conducted on bay sediments at the nearby 32nd Street Naval Station, Piers 1 through 13 by the Naval Oceans Systems Center in 1979 in support of a proposed dredging project. Sediment copper concentrations contained in the Naval Ocean Systems Center studies show that copper concentrations averaged 385 mg/kg at Navy Piers 1 to 13 in 1979. Navy Piers 10 to 13, which were included in the Paco Terminals Inc. study area, had sediment copper concentrations ranging from 27 mg/kg to 397.8 mg/kg. In 1982, Lockheed Ocean Science Laboratories conducted a bioassay of sediments midway

between the 24th Street Marine Terminal and Navy Pier 13 in support of a proposed dredging project. The average sediment copper concentration determined at this location in the Lockheed Ocean Science Laboratories studies was 290 mg/kg.

8. The sediment copper concentration of 397.8 mg/kg referenced in Finding No. 7 occurred on the south side of Navy Pier 10 near the shoreline approximately 4000 feet north of Paco Terminals Inc.. Navy Pier 13 is located approximately 1200 feet north of Paco Terminals Inc.. The copper concentrations for Navy Pier 13 contained in the 1979 Naval Ocean Systems Center study referenced in Finding 7 ranged from 27 mg/kg to 161 mg/kg with an average copper concentration of 116 mg/kg. The Regional Board does not believe that the 1979 Naval Ocean Systems Center and the 1982 Lockheed Ocean Science Laboratories data referenced in Finding 7 conclusively demonstrate that the level of copper concentrations existing at 24th Street Marine Terminal in 1979, prior to the occupation of the site by Paco Terminals Inc. could be characterized by a copper concentration of 385 mg/kg. The Naval Ocean Systems Center data cited in the March, 1986 Westec report indicates that the average copper concentration in sediments adjacent to Navy Pier 13, located approximately 1200 feet north of the 24th Street Marine Terminal averaged 116 mg/kg in 1979 - prior to the occupation of the 24th Street Marine Terminal site by Paco Terminals Inc.. The Lockheed Ocean Systems Center study sediment data collected in 1982 - after the occupation of the 24th Street Marine Terminal site by Paco Terminals Inc. - at an area approximately 600 feet north of a storm drain receiving storm runoff from Paco Terminals Inc., indicates that sediment copper concentrations in that area increased to 290 mg/kg. The increase of copper in the bay sediment in that area may have been the result of the discharge of storm runoff containing elevated concentrations of copper to the storm drain during storm events. The Regional Board believes that the Regional Board staff data, collected in 1979 in the bay sediments adjacent to the 24th Street Marine Terminal, and referenced in Finding 6 is the best available data to establish baseline copper concentrations existing at that point prior to the occupation of the site by Paco Terminals Inc.. Accordingly the Regional Board finds that the baseline copper concentration existing in sediments adjacent to the 24th Street Marine Terminal prior to the commencement of operations at the site by Paco Terminals Inc. was 110 mg/kg.

9. Directive 1(b) of Cleanup and Abatement Order No. 85-91 directed Paco Terminals Inc. to examine the cost and feasibility of removing the copper ore contaminated sediment to attain a) a six-month median copper concentration of 5 ug/l; b) a daily maximum copper concentration of 20 ug/l; and c) an instantaneous maximum copper concentration of 50 ug/l in San Diego Bay waters. This copper water quality objective was obtained from the **Water Quality Control Plan, Ocean Waters of California, 1983** (hereinafter referred to as the Ocean Plan), adopted by the State Water Resources Control Board on November 17, 1983. The Ocean Plan is applicable in its entirety to point source discharges of waste to ocean waters. The plan is not applicable to waste discharges to enclosed bays such as San Diego Bay. The **Water Quality Control Policy for the Enclosed Bays and Estuaries of California**, 1974, (hereinafter referred to as the Bays and Estuaries Policy), adopted by the State Water Resources Control Board on May 16, 1974, contains water quality standards applicable to waste discharges to enclosed bays and estuaries such as San Diego Bay. The Bays and Estuaries Policy requires that discharges of municipal wastewaters and industrial process waters to enclosed bays and estuaries

be phased out at the earliest practicable date. The Bays and Estuaries policy does not contain numerical water quality standards for waste discharges to bays and estuaries. The beneficial uses of San Diego Bay are similar, if not identical to those of the ocean. San Diego Bay waters are in hydrologic continuity to waters of the open ocean; however, the bay waters are generally subject to less dilution than ocean waters. Thus the water quality standard to protect the beneficial uses of San Diego Bay waters should be at least as stringent as the standards in the Ocean Plan which provide for the protection of open ocean waters. Accordingly the Regional Board believes that, in the absence of numerical water quality standards specifically applicable to San Diego Bay, any cleanup level selected by the Board should not cause the Ocean Plan water quality standard for copper to be exceeded in bay waters in order to provide for the protection of the beneficial uses of San Diego Bay.

10. The March, 1986 Westec Report contained an evaluation of the extent to which the copper ore in the bay sediment may be migrating from the sediments into the bay water column. Sample station 43, which had a sediment copper concentration of 19,800 mg/kg, was selected as the sampling point for the evaluation. Westec Services Inc. felt that this station represented the worst case situation in that this station had the highest sediment copper concentration in the study area based on the results of sampling conducted by Westec Services Inc. on January 29, 1986. Westec Services believed that if copper concentrations in the water column fell below the copper water quality objective referenced in Finding 9, it was reasonable to assume that copper concentrations in the water column overlying sediments with copper concentrations lower than Station 43 would also not exceed the copper water quality objective referenced in Finding 9. Westec Services Inc. also believed that the "worst case situation" would occur at high tide in San Diego Bay when copper-laden water from other possible discharge sources located between the bay entrance and Paco Terminals Inc. would enter the back bay and influence bay water samples collected adjacent to Paco Terminals Inc. Each water column sample collected was filtered through a 0.45 micron filter to remove the particulate matter. Westec Services Inc. analyzed the sample which passed through the filter to obtain the total "dissolved" copper concentration. Westec Services Inc. also analyzed the particulate matter retained on the 0.45 micron filter to obtain the total particulate copper concentration.

11. The average concentration of total dissolved copper in the water at Station 43 ranged from 3 ug/l (1 meter from the bay bottom under low tide conditions) to 4 ug/l (two meters from the bay bottom under high tide conditions). Westec Services Inc. maintained that these total dissolved copper concentrations were less than the copper water quality objective referenced in Finding 9. The average total particulate copper concentration in the water at Station 43 ranged from 6 ug/l (2 meters from the bay bottom under low tide conditions) to 18 ug/l (two meters from the bay bottom under high tide conditions). Westec Services Inc. maintained that the total particulate copper concentration was less than the 50 ug/l instantaneous maximum water quality objective referenced in Finding 9. Compliance with the copper water quality objective referenced in Finding 9 is only determined through analyses of water samples for total recoverable copper as defined in Title 40, Code of Federal Regulations, Part 136 (40 CFR 136). Total recoverable copper is defined as the concentration of copper determined on an unfiltered sample after vigorous digestion, or the sum of the copper concentrations in both the filtrable

and nonfilterable sample fractions. Accordingly, it is incorrect to measure compliance with the copper water quality objective referenced in Finding 9 by comparing the objective with only the copper concentration found in the filterable sample and excluding the copper concentration found in the nonfilterable sample or vice-versa. Compliance with the copper water quality objective can only be fully determined through comparison with the total recoverable copper concentration of the Station 43 sample results; this value is obtained by summing the copper concentration found in the filterable and nonfilterable sample fractions. The average total recoverable copper concentrations for Station 43, determined by the Regional Board by summing the filterable and nonfilterable copper concentrations reported by Westec Services Inc., ranged from 10 ug/l (2 meters from the bay bottom under low tide conditions) to 21 ug/l (two meters from the bay bottom at high tide conditions). The average total recoverable copper concentrations did not exceed the instantaneous maximum copper water quality objective of 50 ug/l which applies to grab sample determinations. However, the average total recoverable copper concentration did exceed the six month median copper water quality objective of 5 ug/l under both high tide and low tide conditions. Compliance with the six month median objective is measured by calculating the median of daily values during any 180 day period. While a one day sample event is insufficient to determine compliance with a six month median copper water quality objective, it is significant to note that the 5 ug/l six month median objective was exceeded under both high and low tide conditions. Additional sample values would be required to fully confirm that the copper ore contaminated sediment is causing the 5 ug/l six month median objective to be exceeded in the water column.

12. The March, 1986 Westec Report contained data on the copper concentrations in the interstitial water lying in the bay sediment immediately adjacent to the sediment grains. The sampling plan was designed to evaluate the worst case conditions by conducting the sampling at Station 43 which had the highest sediment copper concentration of the January, 1986 sediment samples. Four replicate samples were collected by Westec Services Inc. by inserting syringes into the bay sediment and withdrawing a water sample. The samples were filtered through a 0.45 micron filter to remove particulates, thus sample analysis only determined the total dissolved copper concentration in the interstitial water. The total dissolved copper concentration in the interstitial water ranged from 80 ug/l to 480 ug/l with an average concentration of 214 ug/l.

13. The Regional Board compared the interstitial water concentrations referenced in Finding 12 with the Ocean Plan copper water quality objective referenced in Finding 6. Under this approach it was assumed that the interstitial water was the primary source of contaminants to benthic biota. It was also assumed that the exceedance of the six month median copper water quality objective of 5 ug/l in the interstitial water could adversely affect benthic biota and thus also adversely affect the marine habitat beneficial use of San Diego Bay. Based on the interstitial water copper concentrations discussed in Finding 12 the Regional Board believed that the existing sediment copper concentration appeared to be 1) causing the interstitial water concentrations to greatly exceed the 5 ug/l copper water quality objective, and 2) threatening to adversely affect benthic biota in the copper ore contamination area. By letter dated July 31, 1986 the Regional Board directed Paco Terminals Inc. to collect additional interstitial water samples to determine the areal extent of elevated copper concentrations in the

interstitial waters. Paco Terminals Inc. was also directed to gather sufficient data to define the relationship between sediment copper concentration and interstitial water copper concentration.

14. By letter dated September 11, 1987 Paco Terminals Inc. objected to the Regional Board's application of the Ocean Plan copper water quality objective referenced in Finding 6 to interstitial water. Paco Terminals Inc. maintained that interstitial waters from most sediments from embayments typically exceed Ocean Plan limits for many chemical variables such as sulfides, ammonia, and biological oxygen demand, because the interstitial water is relatively restricted compared to the overlying water column with reduced opportunity for dilution. The Regional Board believes that concentrations of some chemical constituents would be expected to be naturally greater in interstitial water than in the overlying water column. However, Paco Terminals Inc. has not demonstrated that the interstitial water copper concentrations in the affected area are within the range of concentrations which could be expected to naturally occur.

15. On March 24, 1987, Paco Terminals, Inc. submitted a report prepared by Westec Services, Inc. entitled **Evaluation of Copper in Interstitial Water from Sediments at Paco Terminals, San Diego Bay, Phase II**(hereinafter referred to as the March, 1987 Westec Report. The stated objectives of this report were to 1) define the relationship between copper concentrations in the sediment and interstitial water, and 2) if such a correlation does exist, use the correlation to determine the horizontal distribution of copper in the interstitial water adjacent to Paco Terminals Inc.. Westec Services Inc. collected 36 core samples on February 4, 1987 at distances up to 170 feet from the Paco Terminals Inc. pier face. Westec Services Inc. reported that due to probable interferences from salts in the sea water, interstitial water samples had to be diluted with deionized water to reduce the interference. The dilution process reduced the level of detection for copper from 2 ug/l to 20 ug/l. Thus the interstitial water copper concentration could not be compared with the Ocean Plan 5 ug/l copper water quality objective due to the reduction in the level of detection to 20 ug/l. The interstitial water concentrations ranged from <20 ug/l to 300 ug/l (one of the 36 interstitial water samples was not analyzed due to an insufficient sample volume). The sediment copper concentration ranged from 21 ug/l to 21,700 ug/l.

16. The March, 1987 Westec Report contained the results of a linear regression analysis of the data referenced in Finding 15. The purpose of the evaluation was to determine if there was a statistically significant relationship between copper concentrations in the interstitial water and the sediment. Two correlation relationships between the copper concentration in the interstitial water and sediment were developed. One of the correlation relationships employed all 35 sample results. The second correlation relationship employed only 33 sample results; two sample results were removed from consideration because of possible sample contamination. Both correlation relationships assumed that 16 sample results, with reported interstitial water copper concentrations of <20 ug/l, were actually 20 ug/l - a worst case assumption. The sediment copper concentrations at

which the 50 ug/l instantaneous maximum Ocean Plan copper water quality objective is attained in the interstitial water as predicted by the two correlation relationships are presented below:

Linear Regression Analysis	Correlation Value	Number of Samples	Sediment Copper Concentration
1	0.369	35	3,950 mg/kg
2	0.593	33	7,050 mg/kg

Westec Services Inc. believed that Analysis 2, which determined that removing the copper contaminated sediment to a copper concentration of 7,050 mg/kg would result in a interstitial water concentration of 50 ug/l, was the best estimate due to the higher correlation value.

17. The March, 1987 Westec Report did not establish a clearly defined relationship between the sediment copper concentration and either the Ocean Plan copper water quality objective six-month median limitation of 5 ug/l or the daily maximum limitation of 20 ug/l. However, as shown in Finding 16, the available data does indicate that a relationship exists between the Ocean Plan copper water quality objective instantaneous maximum limitation of 50 ug/l and the sediment copper concentration. Based on the regression analysis referenced in Finding 16, an interstitial water copper concentration of 50 ug/l is associated with a sediment copper concentration of 7,050 mg/kg. The Regional Board believes that although the available data do not provide a clearly defined relationship between the six-month median copper concentration limit of 5 ug/l and a particular sediment copper concentration, the data indicates that the sediment copper concentration corresponding to the Ocean Plan six month median concentration limit would likely be no greater than 1000 mg/kg.

18. The March, 1986 Westec Report examined the effects of the copper contaminated sediment on the benthic biota in the vicinity of Paco Terminals Inc. The report characterized the benthic community as impoverished with low numbers of species and individuals and low species diversity. The report found that 93.5 percent of the area influenced by the copper contaminated sediment was already influenced by shipyard operations and other harbor activities prior to the commencement of operations at Paco Terminals Inc. The impoverished condition of the benthic community was attributed in part to disturbances from harbor activities such as ship movement, with the attendant propeller wash and scour, and maintenance dredging. The impoverished condition of the benthic community was cited as a historic condition in that it had been noted in other studies in the general vicinity of 24th Street Marine Terminal in 1974 and 1977- prior to the commencement of operations by Paco Terminals Inc. No statistically significant relationship between sediment copper concentration and total number of species, total number of individuals and species diversity was found.

19. The March, 1986 Westec Report does not conclusively demonstrate that the copper ore does not have the potential to adversely affect benthic communities. As previously stated in Finding 18, the vitality of the benthic community was

depressed prior to the deposition of copper ore in the sediment. It is possible that a direct correlation between sediment with a high copper concentration and benthic community indices might be found in areas which have more diverse benthic communities. The Regional Board also believes that some of the environmental stresses which were responsible for the depressed condition of the benthic community prior to the commencement of operations by Paco Terminals Inc. may be reduced in the future. Improved controls over anti-fouling boat hull paints and painting techniques and other changes in vessel activities could provide conditions conducive to an increase in the diversity and numbers of marine organisms in the vicinity of Paco Terminals Inc. However if copper ore is allowed to remain on the floor of San Diego Bay in the present high concentrations, the potential vitality of future biological communities might be limited long after other environmental stresses have been reduced or eliminated.

20. By letter dated September 11, 1987 Paco Terminals Inc. submitted information pertaining to the potential for migration of the copper ore contaminated sediment to other portions of San Diego Bay. It was reported that the probability for significant migration of the copper contaminated sediment is low due to the following factors:

    a) The copper ore is very dense and sinks rapidly. Any copper ore re-suspended by tidal action or ship propeller wash would probably not travel very far before sinking to the bay bottom;

    b) Tidal currents adjacent to 24th Street Marine Terminal are generally low;

    c) The number of large vessels capable of re-suspending the copper ore contaminated sediment while passing over the area is small due to it's location near the terminus of the main San Diego Bay navigation channel; and

    d) A review of 10 sets of quarterly NPDES permit monitoring reports covering the period 1985 - 1987 and other data indicates that the copper ore contaminated sediment is not migrating.

    The Regional Board believes that migration of the copper ore contaminated sediment can be expected to remain quite slow unless increases in tidal currents and/or vessel activities occur. However, any dredging activities in the area near Paco Terminals could contribute significantly to the migration of the copper ore within the bay.

21. The March, 1986 Westec Report evaluated State Mussel Watch data contained in the **California State Mussel Watch Report, 1981-1983.** Data provided by the State Mussel Watch Program shows that mussels held at Station 882, located adjacent to Paco Terminals Inc., had some of the highest copper concentrations found in the mussel watch program. The mussel watch sample results (dry weight) showed an average copper concentration of 58.1 ug/g in January, 1982, 60.3 ug/g in December, 1982, 78.7 ug/g in January, 1984, and 88.1 ug/g in January, 1985. All mussel watch sampling data at Station 882 exceeded both the 85 and 95 percent Elevated

Data Level (EDL)[1] for copper of 12.1 ug/g dry weight and 24.4 ug/g dry weight, respectively; thus the mussel copper concentrations represent very elevated concentrations. Westec Services Inc., citing data from the 1981-83 Mussel Watch, conclude that a 38.4 percent reduction in copper concentration found between depurated[2] and undepurated mussel samples collected from Station 882 is due to the elimination of inorganic particulate matter in the mussel digestive tract. With the particulate copper removed, the remaining results provide a more accurate reflection of actual copper concentrations in the mussel tissue. Westec Services Inc. maintains that much of the copper found in the tissues of the mussels held at Station 882 is from discharges from the nearby shipyard operations.

22. The Regional Board believes that because the sediment near Paco Terminals Inc. contains a high proportion of copper ore, any sediment which is found within the digestive tract of mussels at Station 882 might also contain a high proportion of copper ore. As noted in Finding 21, the effect of this ingested sediment on the analytical results for Station 882 was documented in the 1981-83 Mussel Watch. During that program ten mussel watch stations, including Station 882, were selected statewide and were analyzed in both a depurated and a non-depurated condition. Depuration was found to reduce copper concentrations at Station 882 by 38.4%, while reductions found at the other nine stations ranged between 7.5 % and 25.1%, and averaged only 13.2%. (Subsequent Mussel Watch samples have not been depurated.)

23. As previously stated in Finding 21, Westec Services Inc. believes that the high State Mussel Watch copper concentrations found near Paco Terminal Inc. may be due in large part to the proximity of the terminal to the 32nd Street Naval Station and other commercial ship repair facilities. These vessel repair areas start at Pier 13 of the 32nd Street Naval Station, approximately 1000 feet north of the 24th Street Marine Terminal, and extend approximately three and one-half miles north to the Coronado Bridge. Five Mussel Watch stations have been located in that area during the Mussel Watch Program. Of these five stations, Station Nos. 886 and 887 are near the NASSCO ship repair facility approximately 3 miles north of Paco Terminals; Station No. 885 is located at Buoy 30 on the west side of the navigation channel approximately 1.5 miles north Paco Terminals; Station No. 882.6 is located at the extension of Sampson Street approximately 2 miles north of Paco Terminals; and Station No. 882.4 is located near the end of Pier 13 less than 2000 feet north of Paco Terminals. Since Station No. 882.4 is located at the extreme south end of the vessel repair facilities, less than 2000 feet from Paco Terminal's ore transfer facility, any copper-based anti-fouling paints which

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1 The Elevated Data Level (EDL) has been developed by the State Mussel Watch Program to identify locations where levels of toxic substances are significantly higher than the levels measured statewide. The 85 or 95 percent EDL is that concentration of a substance that equals or exceeds 85 or 95 percent of all State Mussel Watch measurements of the substance in the same mussel type throughout the State.

2 Depuration is a process whereby mussels are placed in aerated or circulating "clean" sea water essentially free of trace metals and synthetic organic compounds as soon after sample collection as possible.

originate in the ship repair yards north of Paco Terminals and affect Station 882 at Paco Terminals Inc. should have at least as great an impact on mussels at Station No. 882.4. Mussel Watch data provided in the table below reveal that the copper concentration in mussels at Station 882.4 is less than the concentration found at Stations 882 and 882.2. This condition exists even after the data have been adjusted to compensate for the elevated level of particular copper contained within the mussels at the 24th St Marine Terminal station(s). The unusually high concentration of particulate copper entrained within the digestive tracts of the mussels at Station No. 882 indicate that there is a high level of particulate copper within the waters near that station. Although the particulate copper which is contained within the digestive tract is not a measure of the copper which is incorporated into mussel tissue, it can be viewed as a potential source of copper, which might, in part, become assimilated into the mussel tissue.

STATE MUSSEL WATCH COPPER CONCENTRATION DATA

Station Number	Date	Copper Conc.(ug/g) Non-Dep	Dep[3]	Distance (ft) and Direction from Station G-16[4]	
882.4	12/29/82	32.67	30.22	1,880	North
882.2	12/29/82	50.27	30.94	710	North
882.0	12/29/82	60.32	37.13	330	South
882.4	01/04/84	31.8	29.4	1,880	North
882.0	01/04/84	78.7	48.4	330	South
882.4	01/04/85	21.20	19.61	1,880	North
882.0	01/04/85	88.10	54.23	330	South

3 Sample values are also shown reduced by the proportion indicated in the 1981-83 Mussel Watch depuration study in order to simulate the copper concentrations which might be expected to exist if all mussels had been depurated. Station No. 882.4, which is not expected to be heavily influenced by copper ore, is reduced by 7.5% and Station Nos. 882 and 882.2, which are expected to be heavily influenced by copper ore, are reduced by 38.4%.

4 Station G-16 is located along the pier face of Paco Terminals, Inc. The exact location of this station is described in the March 1986, Westec Report.

24. The March, 1986 Westec Report examined the cost and feasibility of five different cleanup options for removal of the copper contaminated sediment to sediment copper concentrations of 110 mg/kg, 350 mg/kg and 1000 mg/kg. The five cleanup options, in order of increasing cost, were: (1) dredging of sediment with ocean disposal of the dredged material, (2) dredging of sediment with disposal at Otay Sanitary Landfill, (3) dredging of sediment with truck shipment to mine for reclamation of copper ore, (4) dredging of sediment followed by rail shipment to mine for reclamation of copper ore, and (5) dredging of sediment with disposal at Casmalia landfill. The projected costs to achieve the three alternative cleanup levels is summarized as follows:

Sediment Copper Concentration	Dredge Volume	Cleanup Cost Range
110 mg/kg	575,186 yds^3	$3,709,094 - $176,547,735
350 mg/kg	246,481 yds^3	$1,661,358 - $75,727,434
1000 mg/kg	57,402 yds^3	$472,922 - $17,722,649

The method to be employed by Paco Terminals Inc. for disposal of the dredged copper ore sediment is not known at this time. Westec Services Inc. reported that from an operational, logistic, and cost viewpoint, ocean disposal of the dredged material was the most feasible alternative at this time. However significant problems could arise in obtaining the necessary dredge spoil ocean disposal permit from the Army Corps of Engineers. Land disposal of the dredged material is also a possibility; however significant problems could arise in transporting large amounts of dredge material by truck and in gaining approval to dispose of the material in a landfill. Two of the dredge spoil disposal options involved returning the copper ore contaminated sediment to the mine where it originated for reclamation of the copper ore. These disposal options would be contingent on the quality of the copper ore and its potential for reclamation using the leaching process employed at the mine.

25. The preponderance of evidence in this matter demonstrates that operations at Paco Terminals Inc. resulted in the discharge of copper ore to San Diego Bay in direct violation of waste discharge requirements prescribed by the Regional Board and contained in Order Nos. 79-72 and 84-50. Therefore, under the terms and conditions of California Water Code Section 13304, the Regional Board is not required to demonstrate that the copper ore contaminated sediment is causing, or is threatening to cause, a condition of pollution in San Diego Bay in order to require its removal from the waters of the state. However, the Regional Board believes that the copper ore contaminated sediment is threatening to adversely affect the marine habitat beneficial use of San Diego Bay. The Regional Boards review of the available information indicates that the copper ore contaminated sediment significantly contributes to the very elevated copper concentrations found in mussels at Mussel Watch Station 882. The copper ore contaminated

sediment also appears to have caused the exceedance of Ocean Plan copper water quality objectives in both the water column and interstitial water of the affected portion of San Diego Bay.

26. The Regional Board, in determining the appropriate level of cleanup in this matter, is guided by the State Water Resources Control Board's Resolution 68-16, **Statement of Policy with Respect to Maintaining High Quality of Waters In California.** This policy provides that existing water quality be maintained when it is reasonable to do so. This policy further provides that any change in water quality be consistent with maximum public benefit, and not unreasonably affect beneficial uses. The Regional Board has determined that discharges of copper ore from Paco Terminals Inc. have resulted in a change in water quality in the affected portion of San Diego Bay; the change in water quality threatens to adversely affect the marine habitat beneficial use of San Diego Bay. The Regional Board, based on the available information, is directing Paco Terminals Inc. to remove the copper ore contaminated sediment from the affected portion of San Diego Bay to attain a cleanup level sediment copper concentration of less than 1000 mg/kg. This cleanup level represents less than 100 percent removal of the copper ore contaminated sediment. The Regional Board has determined that this cleanup level is reasonable, consistent with maximum public benefit, and will not unreasonably affect beneficial uses.

27. This enforcement action is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000, et seq.) in accordance with Section 15321, Chapter 3, Title 14, California Administrative Code.

It is hereby ordered that, pursuant to California Water Code Section 13304:

1. Paco Terminals, Incorporated, shall reduce the sediment copper concentration in the affected portion of San Diego Bay identified in the March, 1986 Westec Report to a sediment copper concentration less than 1000 mg/kg by January 3, 1989.

2. Paco Terminals Inc. shall submit a technical report to the Regional Board no later than February 4, 1988 containing a discussion of the proposed procedures to cleanup the copper contaminated sediment. The report shall contain a detailed time schedule for completion of all activities associated with the cleanup of the copper ore contaminated sediment. The report shall also include the sampling procedures that will be used to determine the completion of the cleanup.

3. Paco Terminals Inc. shall submit cleanup progress reports to the Regional Board on a quarterly basis, until in the opinion of the Regional Board Executive Officer, the cleanup of the copper contaminated sediment has been completed. The progress reports shall include information on a) the percent completion of the cleanup project, b) the status of requests for permits and their expected approval dates, c) any anticipated deviation from the time schedule submitted in accordance with

Directive 2 of this Addendum, and d) any other relevant information. The progress reports shall be submitted in accordance with the following reporting schedule:

Reporting Period	Report Due
January, February, March	April 30
April, May, June	July 30
July, August, September	October 30
October, November, December	January 30

4. Paco Terminals Inc. shall no later than December 3, 1988 submit a post-cleanup sampling plan to verify the attainment of the prescribed cleanup standards in the area of sediment copper contamination identified in the March, 1986 Westec Report. Upon approval of the sampling plan by the Regional Board Executive Officer, Paco Terminals Inc. shall collect and analyze the samples prescribed in the sampling plan. The post-cleanup sample results shall be submitted to the Regional Board no later than April 3, 1989.

5. Directive No. 5 of Cleanup and Abatement Order No. 85-91 is hereby rescinded.

PROVISIONS

1. Paco Terminals Inc. shall submit to the Regional Board on or before each completion date a report of compliance or noncompliance with the specific task. If noncompliance is being reported, the reasons for such noncompliance and an alternative compliance schedule shall be stated. The discharger shall notify the Regional Board by letter upon return to compliance with the time schedule.

Ordered by Ladin H. Delaney
Ladin H. Delaney
Executive Officer

Dated: November 13, 1987

DTB:GBP:LKM

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

CLEANUP AND ABATEMENT ORDER NO. 85-91

PACO TERMINALS, INC.
NATIONAL CITY
SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board), finds that:

1. On November 26, 1979 the Regional Board adopted Order No. 79-72, National Pollutant Discharge Elimination System (NPDES) Permit No. CA0107930, *Waste Discharge Requirements for Paco Terminals, Inc.* Order No. 79-72 regulated a potential intermittent discharge of copper ore from Paco Terminals, Inc., a copper ore transfer facility, located adjacent to San Diego Bay. Order No. 79-72 contained an expiration date of November 26, 1984. On November 26, 1984 the Regional Board adopted Order No. 84-50, NPDES No. CA0107930, *Waste Discharge Requirements for Paco Terminals, Inc. San Diego County.* Order No. 84-50 renewed the requirements of Order No. 79-72 and added additional discharge prohibitions to eliminate potential intermittent discharges of copper ore to San Diego Bay from Paco Terminals, Inc.

2. Paco Terminals, Inc. ships an annual minimum of 137,750 tons of copper concentrate, a rendered form of cupric ferrous sulfide ore (chalcopyrite) through the San Diego Unified Port District's 24th Street Marine Terminal on San Diego Bay. The copper ore is shipped to the marine terminal via railroad gondola cars. Front-end loaders then stockpile the copper ore on asphalt pads adjacent to the loading pier for storage. Upon arrival of a transport ship the copper ore is moved to a container crane by the front-end loaders. The container crane then loads, using a clamshell bucket, the copper ore onto ships for export to other destinations.

3. Due to the potential discharge of copper ore to San Diego Bay by both storm runoff from the marine terminal area coming in contact with the copper ore and windborne transport of the copper ore, Paco Terminals, Inc. was required by the Regional Board to develop a Water Pollution Control Plan (Best Management Practices) to prevent the copper ore from being discharged to San Diego Bay under Provision B.2 of Order No. 79-72.

   By letter dated November 26, 1979 Paco Terminals, Inc. submitted the following Water Pollution Control Plan, which was subsequently approved by Regional Board staff.

   a. Onsite storm drain inlets would be covered with a water filtration material to prevent any discharge of copper ore through the storm drains to San Diego Bay due to storm runoff.

b. Copper ore stockpiles would be covered with a nylon reinforced polyethylene material to prevent the discharge or spillage of copper ore to San Diego Bay through wind action or storm water runoff.

c. During ship loading operations water trucks would be used to prevent the discharge or spillage of copper ore to San Diego Bay through wind action. In addition, net and nylon reinforced polyethylene tarps would be used to prevent the discharge or spillage of copper ore to San Diego Bay.

d. After ship loading operations, street sweepers would be used to remove any residual copper ore from the pavement area.

4. On July 31, 1984 Paco Terminals, Inc. submitted their application for renewal of Order No. 79-72 and amended their November 26, 1979 Best Management Practices Plan. The amended Best Management Practices Plan was approved by the Regional Board and included as Finding No. 7 to Order No. 84-50:

"a. The storage pad at Berth Four, 24th Street Terminal is constructed in such a manner that the pad slopes landward in a line approximately 150 feet from the pierface. Concentrates, once removed from the railcars will be stored in stockpiles behind the slopeline which will be clearly identified. This will eliminate the possibility of any run off of concentrates over the pierface into the bay. By placing the concentrates a greater distance from the bay, the possibility of concentrate being blown into the bay will be further reduced. (See Attachment A of this Order)

b. By storing the concentrate as described in paragraph a, all run off water from the stockpiled concentrates will flow landward and will be contained in the storage pad area. Storm drains on the pad will be sealed and closed with the exception of a twelve inch riser pipe, the open end of which will be covered with polyester filtration cloth. This type of drainage system will allow water to flow into the storm drain only after it has reached sufficient depth to allow settling of the concentrates. The filtration cloth will further reduce the possibility of discharge of contaminants.

c. Concentrates will only be placed on the shipside of the slopeline during actual loading operation as the concentrates are being placed onboard ship. It is expected that there will be a maximum of five working days per month during which the concentrates would be placed on the shipside of the slopeline. At all other times the concentrates will be stored on the landside of the slopeline.

d. At no time will concentrates be stored or placed within 20 feet of the pierface. This 20 foot safety zone will ensure that concentrates are kept back from the pierface to eliminate the possibility of spillage into the bay as concentrates are being handled on the dock. This safety zone will be clearly identified. (See Temporary Storage Boundary - Exhibit "A" attached hereto)

e. Concentrates, once unloaded and stockpiled at the facility, will be completely covered with nylon reinforced polyethylene tarps which will be held in place by rubber ties. Tarps will be positioned and secured to prevent any blowing of the stockpiled concentrates. The tarps will remain over the concentrates at all times and will only be removed immediately before vessel loading.

f. Once tarps are removed from the concentrates in preparation for loading, and at all times during the loading operation, Paco Industries, Inc. will maintain on hand a manned 3,000 gallon water truck. This truck is capable of spraying a 40 foot wide path of water and will constantly patrol the entire dock area, spraying water as frequently as necessary to wet down the concentrates, thereby preventing it from being blown by the wind. Spraying of water on the shipside of the slopeline will be in the minimum amounts necessary to prevent blowing of concentrates. In no event will amounts of water be added to concentrates in this area which will permit run off into the bay.

g. During loading operations, concentrates will be released from the clam bucket in to the ship's hold in such a manner that concentrates will not be spilled into the water.

h. At the completion of loading concentrates on board ship, any concentrate residue remaining on the dock will be immediately cleaned up with front end loaders and by hand with shovels and brooms. There will be a new emphasis on manual labor (shovels and brooms) in cleanup operations since this is the most thorough cleanup method. In no event will water be used to clean concentrate residue from the storage pad on the ship side of the slopeline. Any remaining concentrates will be stockpiled landside of the slopeline and placed under tarps as described above."

5. Order No. 79-72 contains the following applicable receiving water limitations and provisions:

a) Receiving Water Limitation A

"This discharge shall not cause a violation of any applicable water quality standard for receiving waters adopted by the Regional Board or the State Water Resources Control Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Federal Water Pollution Control Act, or amendments thereto, the Regional Board will revise and modify this Order in accordance with such more stringent standards."

The water quality standards referenced above are contained in the Regional Board's *Comprehensive Water Quality Control Plan Report 1978 Amendments, San Diego Basin (9)* (Basin Plan). One pertinent water quality objective contained in the Basin Plan states:

"All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal or aquatic life..."

b) Provision B.1

"Neither the treatment nor the discharge of pollutants shall create a pollution, contamination, or nuisance as defined in the California Water Code."

c) Provision B.2

"Paco Terminals, Inc. shall develop and implement a Water Pollution Control Plan, acceptable to the Executive Officer of this Regional Board, detailing means of controlling the discharge of pollutants from the copper ore stockpiling and loading operation at the 24th Street Marine Terminal. In developing the plan, the discharger should consider methods of segregating the stockpiled copper to prevent contact with storm runoff discharged to San Diego Bay. Upon approval by the Executive Officer and the Regional Administrator, the Water Pollution Control Plan developed by the discharger shall become a condition of this permit."

6. Order No. 85-40 contains the following applicable prohibitions, receiving water limitations and provisions:

a) Prohibition A.2

"The deposition of discharge of copper concentrate ore into San Diego Bay or at any place where it would be eventually transported to San Diego Bay is prohibited."

Note: California Water Code Section 13050 defines contamination, pollution and nuisance as follows:

i) "Contamination" means an impairment of the quality of the waters of the state by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease. "Contamination" shall include any equivalent effect resulting from the disposal of waste, whether or not waters of the state are affected.

ii) "Pollution" means an alteration of the quality of the waters of the state by waste to a degree which unreasonably affects (1) such waters for beneficial uses, or (2) facilities which serve such beneficial uses. "Pollution" may include "contamination".

iii) "Nuisance" means anything which: (1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property, and (2) affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal, and (3) occurs during or as a result of the treatment or disposal of wastes.

b) Discharge Specification B.2(c)

"Effluent discharged to San Diego Bay must be essentially free of...substances toxic to marine life due to increases in concentrations in marine waters or sediments."

c) Discharge Specification B.3

"The discharger shall comply with the Water Pollution Control Plan described in Finding No. 7. Any proposed amendment to the Water Pollution Control Plan must be approved in writing by the Executive Officer."

d) Receiving Water Limitations C.1(d)

"Water shall not contain substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses."

e) Receiving Water Limitation
C.5(a) "Toxicity"

"All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life."

f) Receiving Water Limitation
C.6 "Toxic Materials Limitations

"The discharge shall not cause the following toxic material limitations to be exceeded in the receiving waters upon the completion of initial dilution except that limitations indicated for radioactivity shall apply directly to the undiluted waste effluent."

Constituent	Unit	6-Month[1] Median	Daily[2] Maximum	Instantaneous[3] Maximum
Copper	µg/l	5	20	50

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[1] The six-month median concentration limit shall apply as a moving median of daily values for any 180-day period in which daily values represent flow-weighted average concentrations within a 24-hour period. For intermittent discharges, the daily values shall be considered to equal zero for days on which no discharge occurred.

[2] The daily maximum limitation shall apply to the results of a single composite sample collected over a period of 24 hours.

[3] The instantaneous maximum concentration limit shall apply to grab sample determinations.

(g) Provision D.1

"Neither the treatment nor the discharge of pollutants shall create a pollution, contamination, or nuisance as defined by Section 13050 of the California Water Code."*

(h) Provision D.6

"This discharge shall not cause a violation of any applicable water quality standard for receiving waters adopted by the Regional Board or the State Water Resources Control Board as required by the Clean Water Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Clean Water Act or Amendments thereto, the Regional Board will revise and modify this Order in accordance with the more stringent standards."

The water quality standards referenced above are contained in the Regional Board's *Comprehensive Water Quality Control Plan Report, San Diego Basin (9)* (Basin Plan) and amendments. One pertinent water quality objective contained in the Basin Plan states:

"All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal or aquatic life..."

7. The Water Quality Control Plan for Ocean Waters of California - 1983 (Ocean Plan) was adopted by the State Board on November 17, 1983. The 1983 Ocean Plan established beneficial uses of the ocean waters of the state, water quality objectives, general requirements for management of waste discharges to the ocean, quality requirements for waste discharges, and discharge prohibitions.

8. In a legal opinion issued on January 18, 1984 by the Office of the Chief Counsel for the State Water Resources Control Board, it was determined that the California Ocean Plan water quality standards can be applied to discharges in the absence of standards in the Bays and Estuaries policy. Such authority can be taken from the Porter-Cologne Act, Water Code Section 13000 et seq. which requires Regional Boards, in the adoption of waste discharge requirements, to implement relevant basin plans and to take into consideration the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, and the provisions of Water Code Section 13241.

9. The beneficial uses of San Diego Bay are:

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*Note: The definition of pollution, contamination and nuisance is stated in Finding No. 5 and California Water Code Section 13050.

(a) Industrial service supply
(b) Navigation
(c) Water contact recreation
(d) Noncontact water recreation
(e) Ocean commercial and sport fishing
(f) Saline water habitat
(g) Preservation of rare and endangered species
(h) Marine habitat
(i) Fish migration
(j) Shellfish harvesting

10. On October 28, 1968 the State Water Resources Control Board adopted Resolution No. 68-16, *Statement of Policy with Respect to Maintaining High Quality Waters in California* (hereinafter referred to as the Nondegradation Policy). Under the terms and conditions of the Nondegradation Policy, the existing (pre-discharge) water quality of the San Diego Bay must be maintained unless it is demonstrated that a decrease in water quality (1) will be consistent with maximum benefit to the people of the State, (2) will not unreasonably affect beneficial uses, and (3) will not result in water quality less than prescribed in the Basin Plan or other adopted policies.

11. Monitoring performed by Regional Board staff from 1979 to 1984 at locations adjacent to Paco Terminals Inc. has detected increasing levels of copper concentrations in the bay sediments. Results of samples collected in April, 1979, prior to initiation of Paco Terminals Inc. operations, indicate an average copper concentration adjacent to Paco Terminals Inc. of 110 milligrams per kilogram (mg/kg). The average copper concentration in samples collected by Regional Board staff in June 1983 and June 1984 at the locations previously sampled in 1979 were 5551 mg/kg and 13,717 mg/kg respectively.

12. Additional documentation of elevated copper concentrations in San Diego Bay waters and sediments has been obtained from the California State Mussel Watch Program. Department of Fish and Game staff collected mussel tissue samples suspended in the San Diego Bay water column in December, 1982, January, 1984 and January 1985. The mussel tissue sample results indicate an average copper concentration of 49.2 mg/kg in December 1982, 78.7 mg/kg in January 1984 and 88.1 mg/kg in January 1985. All mussel tissue sampling data collected during 1982 through 1984 exceeded the 90 percent Elevated Toxic Pollutant Levels (ETPL) for mussel tissue copper concentrations established by the State Mussel Watch Program. The ETPL has been developed to identify locations where levels of toxic substances are significantly higher than the levels measured statewide. The 90 percent EPTL is that concentration of a toxic substance that equals or exceeds 90 percent of all measurements of the toxic substance in the same type of sample throughout the state.

13. The copper concentrations found in the mussel tissue are not a direct measurement of copper concentrations in San Diego Bay waters, however the mussel tissue copper concentrations are an excellent indicator of the relative presence of copper at one sampling station versus another sampling station. The high concentrations of copper found within the mussel tissue indicates that a significant amount of copper is migrating from the copper ore-contaminated sediments into the water column.

14. The test mussels used in the State Mussel Watch Program were suspended in the upper water column approximately 25 feet above the contaminated Bay sediment and would accurately reflect the copper concentrations in the water column at that depth. However, the copper concentration in the water column would likely increase as distance from the contaminated Bay sediment decreases. Thus it is likely that the Bay water closest to the sediment and the interstitual water found within the sediments can be expected to have higher concentrations of copper, as compared to the copper concentrations at the 10 foot depth contour assimilated by the test mussels. The copper concentration within the sediments can be expected to have detrimental effects on a wide range of benthic biota, particularly invertebrates, depressing the viability and productivity of the benthos in the Bay sediments adjacent to Paco Terminals Inc.

15. By memorandum dated December 31, 1984 to Mr. Ladin H. Delaney, Regional Board Executive Officer, Mr. John L. Baxter, Regional Manager, Department of Fish and Game made the following observation based on Department of Fish and Game staff review of samples collected by Regional Board and Department of Fish and Game staff:

> "...in the Paco situation, the large volume of copper ore which has been introduced to marine sediments in solid form have contaminated the benthos directly and, by leaching into the surrounding waters, have contaminated the water column at significant concentrations."

The memorandum also stated that:

> "In effect, the Paco situation represents a marine toxic waste site which if left in place will negatively influence the normally occurring, natural living resources of that area for an indefinite time period."

16. By letter dated July 16, 1985 Regional Board staff requested Paco Terminals, Inc. to submit a report which addressed (1) the areal extent of contamination, (2) actions taken for cleanup and (3) a schedule for cleanup. On August 30, 1985 Paco Terminals, Inc. submitted a report, *An Evaluation of Copper in the Marine Environment in the Vicinity of Paco Terminals, Inc., San Diego Bay, California",* prepared by Westec Services, Inc. in response to the Regional Board July 16, 1985 letter. Included in the report were the analysis of samples collected on August 16, 1985 by Westec Services, Inc. of San Diego Bay sediment in the Paco Terminals, Inc. area. The report stated the following:

> "Analysis of grab samples revealed that concentrations of total copper (2300 to 28,600 ppm) at stations (9, 15, 16, 22, 23) along the pier face and near the storm drain (9300 ppm) were higher than elsewhere in the study area. This is consistent with data collected by the RWQCB and Paco's NPDES monitoring studies."

17. The general extent of copper contamination of San Diego Bay sediment caused by Paco Terminals, Inc. based on locations and results of sediment grab samples collected by Regional Board staff and Westec Services, Inc. discussed earlier, includes but is not necessarily limited to:

(a) From the seaward pierface of Paco Terminals, Inc., which includes the shiploading operations, extending westerly in a rectangular manner to approximately 250 feet from the pierface and a width of 1000 feet along the seaward pierface.

(b) The area extending northerly to approximately 250 feet from the storm drain outfall located at the north pierface of the 24th Street Marine Terminal.

More definite studies to delineate the precise area of San Diego Bay sediment contamination by Paco Terminals, Inc. will be performed under the directives of this Order.

18. On October 1, 1985 Regional Board staff conducted an on-site compliance inspection. During the inspection Regional Board staff noted the following conditions which were not in accord with Paco Terminals, Inc. Best Management Practices Program described in Finding No. 4:

(a) A thin layer of copper ore residue covered the entire site up to the seaward pierface;

(b) The majority of the storm drains were uncovered and contained copper ore.

Both Items a and b above are direct violations of Prohibition A.2 and Discharge Specifications B.3 of Order No. 84-50 as stated in Finding No. 6 of this Order.

19. For reasons stated previously, the increasing copper concentration in the portion of San Diego Bay adjacent to Paco Terminals, Inc. is a direct result of discharge or spillage of copper ore from Paco Terminals, Inc. operations. The Regional Board sediment sampling program and the State Mussel Watch Program have clearly documented extremely high, and constantly increasing concentrations of copper in both the sediments and water column of San Diego Bay adjacent to Paco Terminals, Inc. The Regional Board believes the increased copper concentrations caused by discharge or spillage of copper ore from Paco Terminals, Inc. since initiation of operations, is a direct result of one or both of the following:

(a) Inadequate implementation of the previously mentioned Best Management Practices Plan, submitted by Paco Terminals, Inc. as described in Findings No. 3 and 4.

(b) Some inherent weakness in the Water Pollution Control Plan itself which led to the discharge or spillage of copper ore in San Diego Bay.

Accordingly Paco Terminals, Inc. has violated Provision B.2 of Order No. 79-72 stated in Finding No. 5 and Discharge Specification B.3 of Order No. 84-50 stated in Finding No. 6. Based on the October 1, 1985 Regional Board staff inspection of Paco Terminals, Inc. described in Finding No. 18 Paco Terminals, Inc. is threatening to continue to cause violations of Discharge Specification B.3 of Order No. 84-50.

20. Paco Terminals, Inc. has caused a threatened violation of Discharge Specification B.2(c) of Order No. 84-50 stated in Finding No. 6 of this Order. The marked increase in copper concentrations in San Diego Bay sediments caused by the discharge or spillage of copper ore into San Diego Bay has been previously documented in this Order. The migration of copper from the contaminated sediments into the water column threatens to cause an adverse or degraded condition in marine biota detrimental to the marine habitat beneficial use of San Diego Bay.

21. Paco Terminals, Inc. has caused a threatened violation of Receiving Water Limitation A or Order No. 79-72 stated in Finding No. 5, Receiving Water Limitation C.5(a) of Order No. 84-50 stated in Finding No. 6 and Provision D.6 of Order No. 84-50 stated in Finding No. 6. As stated in the previous findings of this Order both the Regional Board and the Department of Fish and Game have found that the copper ore discharged to San Diego by Paco Terminals, Inc. is present in San Diego Bay sediments in concentrations that could be toxic to the marine life of San Diego Bay.

22. Paco Terminals, Inc. has caused a threatened violation of Provision B.1 of Order No. 79-72 as stated in Finding 5 and Provision D.1 of Order No. 84-50 as stated in Finding No. 6. Paco Terminals, Inc. has discharged copper ore to San Diego Bay in concentrations that have created a condition of pollution in San Diego Bay waters as defined in California Water Code Section 13050 and Finding No. 5 of this Order. This finding is based on the following conclusions:

    (a) The migration of copper from the contaminated sediment to the water column is threatening to cause the copper receiving water limitation of 5 µg/l described in Receiving Water Limitation C.6 of Order No. 84-50 and stated in Finding No. 6 of this Order to be exceeded in San Diego Bay waters.

    (b) The water quality objective for copper described in Receiving Water Limitation C.6 of Order No. 84-50 provides for the reasonable protection of the beneficial uses of San Diego Bay waters stated in Finding No. 6 of this Order. Thus in causing the copper concentration of San Diego Bay waters to exceed 5 µg/l Paco Terminals, Inc. has created a condition of pollution in San Diego Bay which threatens to impair the marine habitat beneficial use of San Diego Bay.

23. Paco Terminals, Inc. in causing the discharge or spillage of copper ore into San Diego Bay has violated Prohibition A.2 of Order No. 84-50 as stated in Finding No. 6 of this Order.

24. Paco Terminals, Inc. has caused a threatened violation of Receiving Water Limitation C.6 of Order No. 84-50 as stated in Finding No. 6 of this Order. As previously stated the copper concentrations at the Regional Board sediment sampling stations currently average 13,717 mg/kg. The migration of this copper into the water column has caused elevated copper concentrations of up to 88.1 mg/kg in mussel tissue sampled under the State Mussel Watch Program. Thus leaching of the copper from the affected sediment could cause the 5 µg/l standard for copper to be exceeded in San Diego Bay waters.

25. This enforcement action is exempt from the provision of the California Environmental Quality Act (Public Resources Code, Section 21000 et. seq.) in accordance with Section 15321, Chapter 3, Title 14, California Administrative Code.

IT IS HEREBY ORDERED, That pursuant to Section 13304 of the California Water Code:

1. Paco Terminals, Inc. shall submit a report to this office no later than March 1, 1986 identifying a range of remedial action alternatives to cleanup present, and prevent future, contamination of San Diego Bay resulting from the discharge of copper ore from Paco Terminals, Inc. 24th Street Marine Terminal operations. The report shall examine and determine the (1) cost, (2) efficiency, (3) feasibility, and (4) laterial and vertical extent of copper contaminated sediment associated with each of the following cleanup stratagies:

   (a) Removal and/or treatment of the copper contaminated sediment to attain copper concentrations in the affected San diego Bay sediment contamination zone essentially equivalent to copper concentrations occurring in the sediment contamination zone prior to initiation of operations at Paco Terminals, Inc. in 1979. As documented in Regional Board staff's July 20, 1985 letter to Paco Terminals, Inc. Regional Board staff sampling found copper levels in San Diego Bay sediments adjacent to Paco Terminals, Inc. in April 1979 to average 110 mg/kg. Any other data obtained by Paco Terminals, Inc. pertaining to copper concentration levels in adjacent San Diego Bay sediments prior to initiation of operations by Paco Terminals, Inc. will also be considered if, in the judgement of Regional Board staff, sufficient documentation is provided.

   (b) Removal and/or treatment of copper contaminated sediment to attain the following copper concentrations in San Diego Bay waters to protect the San Diego Bay beneficial uses noted in Finding No. 9.

Constituent	Unit	6-Month[1] Median	Daily[2] Maximum	Instantaneous[3] Maximum
Copper	µg/l	5	20	50

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[1] The six-month median concentration limit shall apply as a moving median of daily values for any 180-day period in which daily values represent flow-weighted average concentrations within a 24-hour period. For intermittent discharges, the daily values shall be considered to equal zero for days on which no discharge occurred.

[2] The daily maximum limitation shall apply to the results of a single composite sample collected over a period of 24 hours.

[3] The instantaneous maximum concentration limit shall apply to grab sample determinations.

Under this cleanup alternative it will be necessary to ascertain the degree of copper migration from the sediments to the water column that will occur and to demonstrate that the copper migration will not cause the copper limitations be exceeded in either the water column or the interstitual water found within the sediment.

(c) A remedial action alternative proposing the attainment of copper concentrations in the affected San Diego Bay sediment contamination zone which concedes contaminated San Diego Bay waters to a degraded status. Under this alternative Paco Terminals, Inc. may propose a level of contaminated sediment cleanup less stringent than that required under cleanup alternatives (a) or (b) listed above.

Under this alternative it will be necessary to ascertain the degree of copper migration from the sediments to the water column that will occur, and, subsequently to determine the effects that the "mobilized" copper will have upon the marine life of San Diego Bay. It will also be necessary to establish, to the satisfaction of the Regional Board, that the proposed copper concentrations would comply with the following criteria in accordance with the State "Non-Degradation Policy":

1. The proposed copper concentrations to be attained in the affected San Diego Bay sediment contamination zone would not alter the equality of San Diego Bay waters to a degree which unreasonably affects the San Diego beneficial uses listed in Finding No. 9.

2. The proposed copper concentrations to be attained in the affected San Diego Bay sediment copper contamination zone will be consistent with the maximum benefit to the people of the state.

3. The proposed copper concentrations to be attained in the San Diego Bay sediment copper contamination zone will not result in water quality less than prescribed in the Basin Plan, Ocean Plan, or other adopted policies.

2. The cleanup alternatives required under Directive 1 of this Order will be evaluated in detail by Regional Board staff. This evaluation will include technical considerations, estimated costs and anticipated water quality effects associated with each alternative. Based on this evaluation a specific cleanup alternative will be selected by Regional Board staff for implementation. Upon notification by the Executive Officer, Paco Terminals, Inc. shall implement the cleanup alternative selected by Regional Board staff.

3. In the interim period until final cleanup is selected, implemented and completed, Paco Terminals, Inc. shall maintain full compliance with the Best Management Practices as described in the terms and conditions of Order No. 84-50.

4. Paco Terminals, Inc. shall dispose of all copper contaminated water and sediment in accordance with all applicable state and federal regulations.

5. Paco Terminals, Inc. shall, upon implementation of the selected cleanup alternative, submit monthly progress reports discussing the cleanup program status and the progress made toward attaining the final selected cleanup criteria. Specific information to be included in the monthly progress report will be determined by Regional Board staff upon selection of final cleanup alternatives.

I Ladin H. Delaney, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of a Cleanup and Abatement Order issued on December 12, 1985.

Ladin H. Delaney

LADIN H. DELANEY
Executive Officer

December 12, 1985

JM:rs